

LIVES OF GREAT MEN ALL REMIND US
THAT WE CAN MAKE OUR LIVES SUBLINE.



AS WE DEPARTING, LEAVE BEHIND US
FOOTPRINTS ON THE SANDS OF TIME

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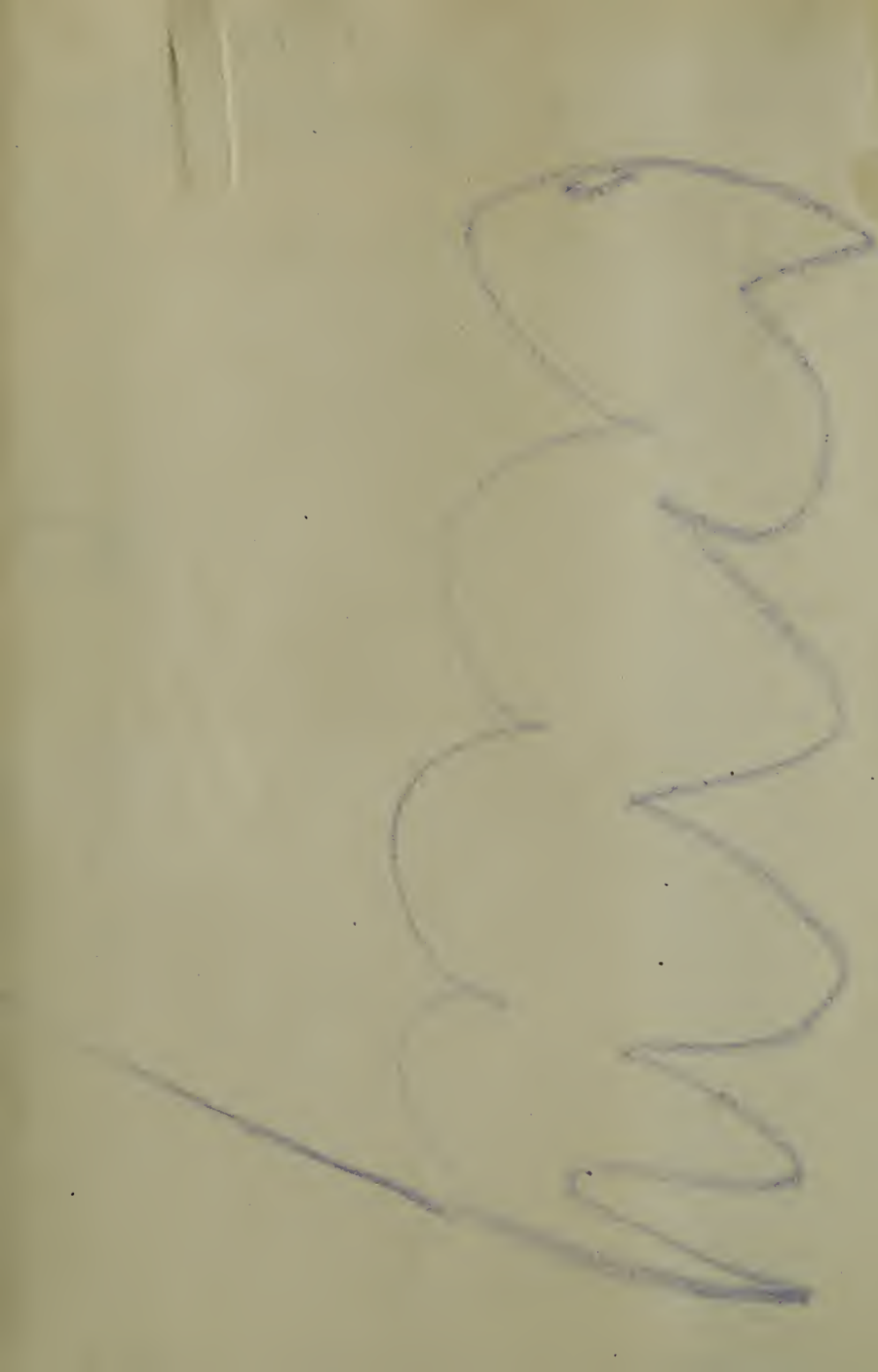
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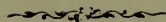
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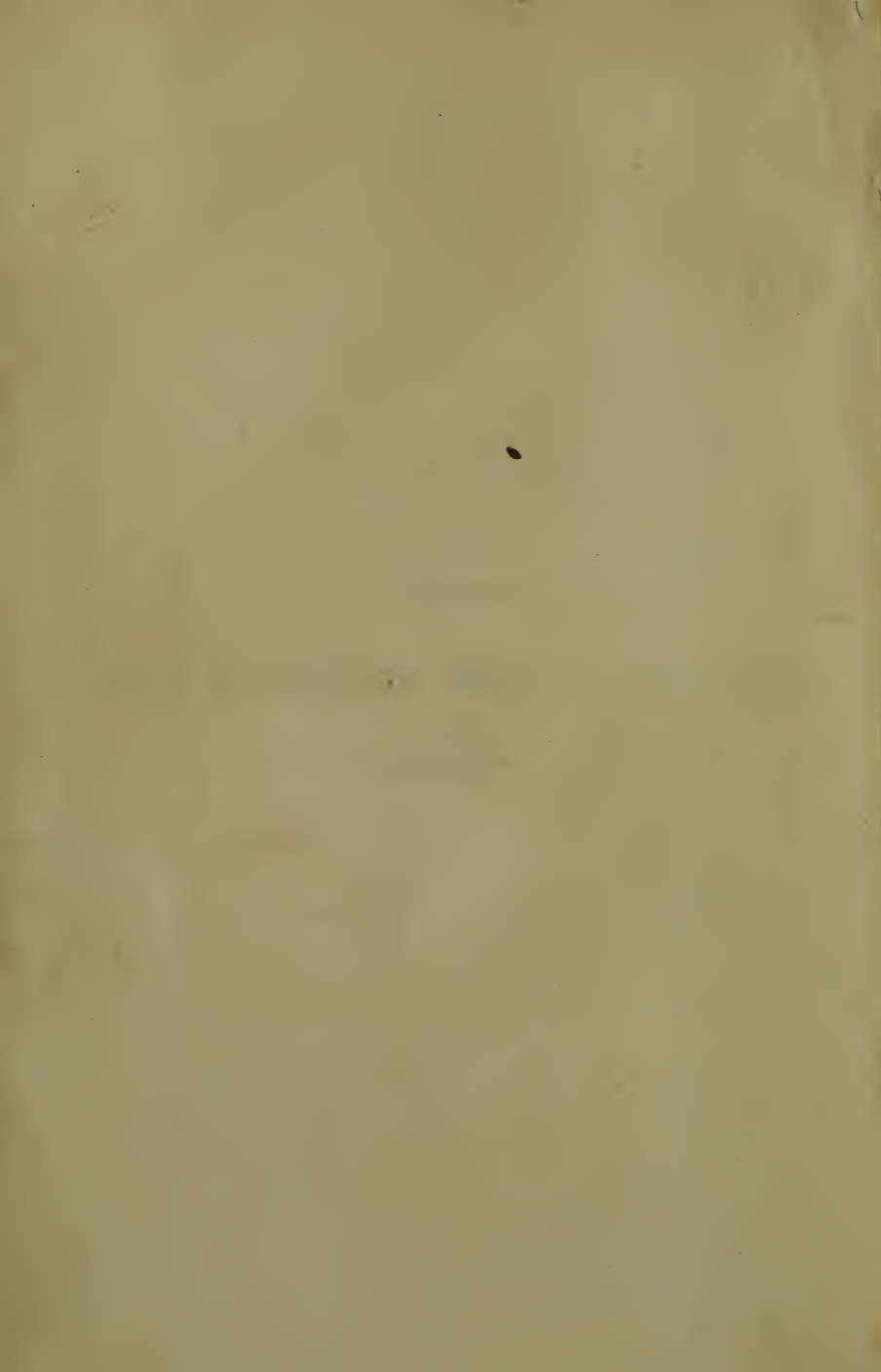
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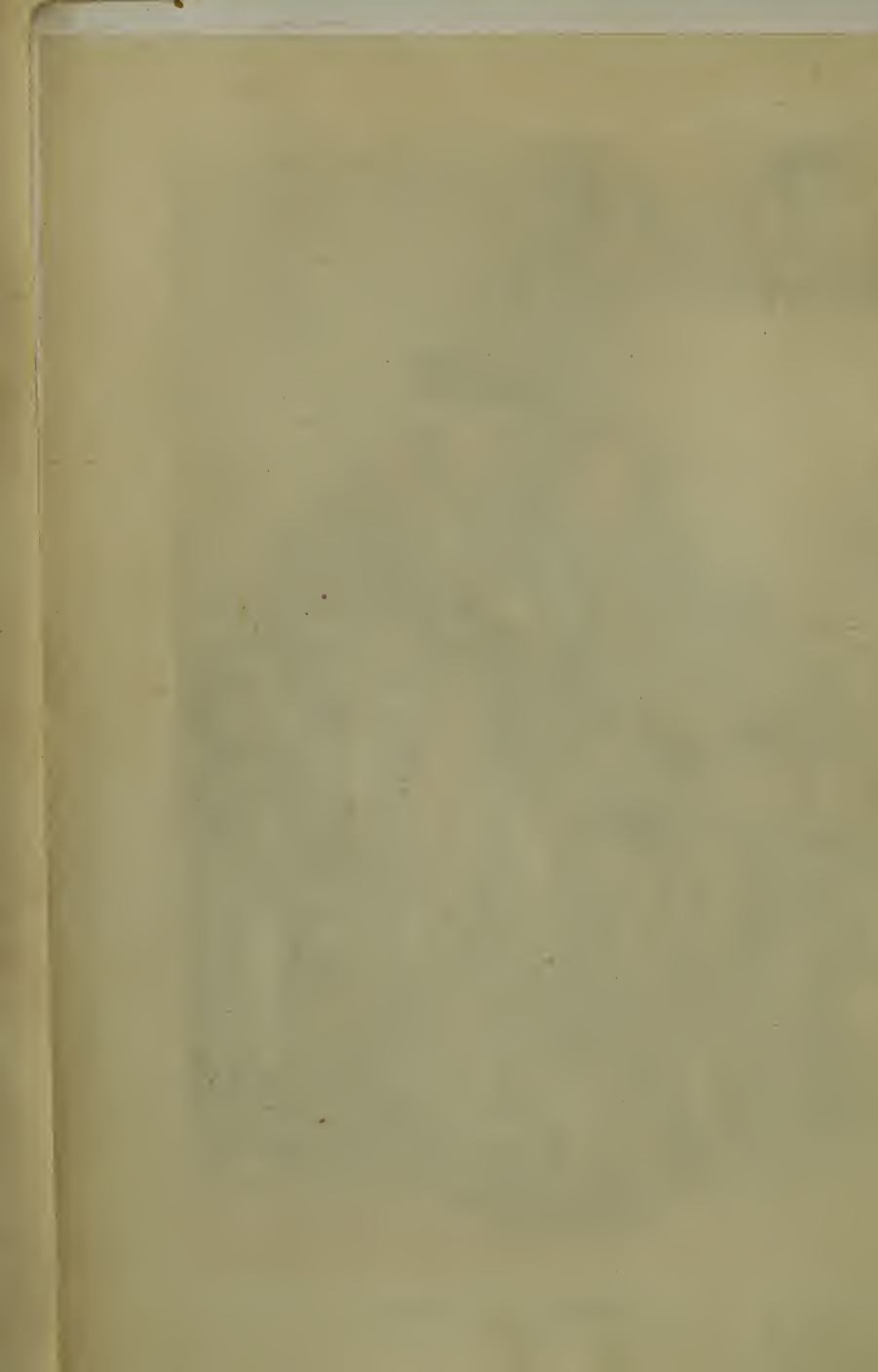
THE STORY OF SIR HUMPHREY DAVY.







HUMPHREY AND THE SAFETY LAMP





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THE

STORY OF SIR HUMPHREY DAVY

AND THE INVENTION OF THE
SAFETY-LAMP.

"Every task thou dost,
Brings strength and capability of act,
He who doth climb the difficult mountain's top,
Will the next day outstrip an idler man.
Dip thy young brain in wise men's deep discourse."

BARRY CORNWALL.

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THE STORY OF SIR HUMPHREY DAVY.

CHAPTER I.

A COAL-MINE.



O our readers know what is COAL? They know, of course, that it is a black substance, hard, brittle, and shining, extracted from the "bowels of the earth," and largely used as fuel; that it makes the comfort of our English homes, and is to a great extent the source of our national wealth; that it feeds our engines and keeps in motion the immense machinery of our factories; that without it, so far as we can see at present, our trains could not traverse the land in all directions, and our ships would cease to cross the ocean in defiance of wind and tide;—but what more do they

know? Do they know how it was produced? Do they know how we came into possession of it?

Thousands of years ago, in what is called by geologists the Carboniferous Period, the earth, as it then was, exhibited a curious and impressive scene. It was thickly covered with immense forests, which grew in the valleys and the plains, on the mountain-sides, in the morasses, on the banks of the rivers and the shores of the seas. These forests grew with an almost incredible rapidity, and after flourishing for awhile, decayed and died, and other forests sprung up in their stead; and the dead forests mouldered and rotted away on the surface of the earth, spreading over it layer upon layer of rich vegetable mould. The climate in the age we speak of was tropical in its heat, and assisted in this rapid decomposition of the woods and groves. And warm rains fell continually, and assisted on their part in the growth and expansion of new forests to replace, as we have said, those which perished. And so the work went on in Nature's vast and magnificent laboratory, until, by the gradual process of elevation and depression which then affected the whole earth, these antediluvian forests came to be buried

deep beneath the surface of the soil, and the character of the climate changing, a new condition of things was inaugurated, and the Carboniferous, or Coal Period, passed away.

For countless ages the buried forests lay in the bosom of the earth, exposed to vast heat and immense pressure, and slowly assuming the appearance of the compact substance which we now call *Coal*. That such was its origin, we know from the results of chemical analysis, which show it to be composed of carbon or charcoal, and of two gases, oxygen and hydrogen, which were essential to the reduction of the wood to its present state of carbon. We know it also from the fact that the miner frequently comes upon blocks of coal in which it is easy to trace the outline of the trunks, branches, and leaves of the antediluvian trees. Coal, therefore, is fossil wood; wood which, during its prolonged interment in the crust of the earth, has undergone certain changes of a chemical nature which alter in part the proportion of its ingredients. Consequently, coal is being made at the present day in many parts of the earth, though not on so grand a scale as in the far-off times of the primeval world. The difference between it and timber in its *living*

state may be understood from the following table :—

In every 100 parts of *wood* we find :

$$\left. \begin{array}{l} 49.1 \text{ parts of carbon,} \\ 6.3 \text{ parts of hydrogen,} \\ 44.6 \text{ parts of oxygen,} \end{array} \right\} = 100.$$

But in every 100 parts of *coal* we find :

$$\left. \begin{array}{l} 82.6 \text{ parts of carbon,} \\ 5.6 \text{ parts of hydrogen,} \\ 11.8 \text{ parts of oxygen,} \end{array} \right\} = 100.$$

It seems, therefore, that in a chemical sense coal differs from wood in containing nearly twice as much carbon, somewhat less hydrogen, which is one of the chief elements of water, and considerably less oxygen, which is one of the chief elements of air; in other words, as the wood gradually decays, the hydrogen and oxygen, or gaseous parts, disappear more quickly than the carbon, or solid parts, and hence a great excess of carbon remains in the fossil wood. Roughly speaking, we may say that you can convert wood into coal by soaking it in water, and exposing it to immense heat and pressure for a considerable period.

Coal is found in many parts of the world, and wherever it is found proves a source of commercial activity and abundant wealth. Britain owes its prosperity in no small degree to this black, shin-

ing, fossilized substance. The principal coal-fields, or coal-producing districts, in our country, are, —Northumberland, Durham, Cumberland, Yorkshire, Lancashire, Derbyshire, Staffordshire, and Nottinghamshire; the central lowlands of Scotland, including the basins of the Forth and Clyde; North Wales and South Wales; and, in Ireland, the provinces of Munster and Connaught.

Turning our gaze to the Continent, we find this valuable mineral extensively distributed over France and Belgium, Silesia, Bohemia, and Spain. It is found abundantly in India, the Burman Empire, China, Japan, and Borneo; in Australia and New Zealand; in Madagascar; in some parts of the West Indies; but nowhere so plentifully as in North America, where it occupies most of the river-basins of the United States, and also of Nova Scotia, New Brunswick, and Cape Breton.

In the United Kingdom nearly one hundred million tons of coals are annually extracted from the coal-mines for home consumption and foreign export. The yearly product has recently been so enormous that grave fears were entertained lest the supply should fail; but the result of extensive investigations made by order of the Govern-

ment would seem to be, that we possess a sufficient store to last for six or seven centuries.

The use of coal does not seem to have been known to the ancients, and it is generally believed that England was the first European country which recognized its valuable qualities. About the close of the thirteenth century it began to be employed in London, but at first only in the arts and manufactures; and the innovation was strongly denounced as injurious to human health! In 1316, Parliament petitioned Edward II. to prohibit its use, and the king accordingly issued a proclamation to that effect; but as wood grew scarcer and dearer, and the expansion of our manufacturing industry rendered necessary an increased supply of superior fuel, the royal proclamation fell to the ground unheeded.

We have said that the coal-producing districts are generally known as the coal-fields (or coal-basins), and that they cover an area frequently of great extent.

Sometimes the coal and the rocks with which it is united occupy the beds of ancient seas and dried-up lakes; and these beds, though they penetrate deep into the crust of the earth, appear at various points upon its surface, and reveal their

existence even to the most careless or least experienced eye. But sometimes they are hidden at a great depth beneath the ground, and there is no visible sign of their whereabouts ; nothing on the surface of the soil to lead you to suspect the presence of subterranean wealth ; and then it is accident or science which leads to their discovery. In France, in 1813, a very important coal-bed was discovered by some persons engaged in sinking a well : among the refuse and waste materials they dug up they observed a black-looking, glittering substance, which on examination proved to be coal. Very often science comes to man's assistance. Geology indicates certain probabilities, which the miner verifies by patient boring ; for coal is always found in connection with certain strata, and where these strata exist our all-important combustible also may reasonably be looked for.

Where it is intended to work a new coal-field, the first step is to sink a couple of shafts, or wells, to the necessary depth : one for the ingress and egress of the miners, the other for purposes of ventilation. These shafts are connected by galleries dug out of the solid rock, and carried in all directions where a supply of mineral can be most

easily and expeditiously procured. The water collecting in these galleries is drawn to the surface by large and powerful pumps, kept in continual motion by steam-power. Iron rails are laid down for the transport of the coal in waggons from the points where the miner hews it to the bottom of the shaft, and there it is raised to the surface by means of ingenious machinery. As the miner's labour is very exhausting, he works but a few hours daily, and is paid a high rate of wages; and his safety underground is provided for, as far as possible, by the most elaborate precautions. The roof and sides of the gallery are propped up by stout timber frameworks, to prevent them from giving way and crushing him while at his work; and inspectors continually perambulate the pit, to see that its ventilation is in thorough order.

But we shall more clearly understand the arrangements adopted in a coal-pit if we descend into one; and this we propose to do, accompanied by Mr. Walter White, who, in his "Northumberland and the Border," describes his visit to the mine at Earsden.

We walk across green fields about a mile to the pit, which, with its machinery and tramways, and

great heaps of coal, and small cottages, and black features generally, presents a marked contrast to hedgerows and fields of grain. Here we observe that the cottages are neat and trim, and kept in excellent order; the offices stand apart, and near them is the infant schoolroom, a clean and well-kept building, accommodating seventy to eighty children. Here we are introduced to "Old Robert," the viewer, or inspector, whom we find to be a grave and serious-minded man, a teetotaler, and a Sunday-school teacher.

We make use of the office as a dressing-room, and each of us there attires himself in a pitman's suit of coarse blue woollen stuff. Soon we are all ready for our enterprise. The mouth of a pit in work is always a busy scene, owing to the rapidity with which the coal is hauled up and hurried away to the shoots or waggons: and here the heavily-laden trains and the large mounds of coal seem to grow every minute longer and larger with the supplies brought from under ground. For the pit we are about to inspect sends up four hundred tons of coal a day.

Up comes the cage,* as it is called, with its burden; then Old Robert, bidding the brakeman,

* A small car, raised and lowered by chains, which affords the means of communication between the pit and the upper earth.

who superintends its alternate ascent and descent, pause for a moment, places us on one side of the cage, and himself on the other. We grasp the bar that crosses between, like a basket-handle, and down, down, down we go in the darkness to a depth of 288 feet! We are conscious of a sensation as if about to faint, a sensation which many of the old hands experience every time they go down; and we are painfully affected by the sudden deprivation of light. At first we can see nothing, when we touch the bottom, but what looks like a couple of torches flaring in the distance; and our bewildered senses are further confused by cavernous noises, the shouts of men and boys, and the hurried heavy tread of horses. Old Robert speaks a word to an invisible individual; an invisible hand, rough and grimy, seizes our own; we step from the cage, and across the tramway, to a wooden bench, where we sit down and endeavour to recover our wonted composure. Meantime the noises are increased by the shoving of waggons into the cage, and by the shock and crash with which the heavy machine rises and falls, almost, as it were, instantaneously. From the depth of the darkness on the right comes a storm of discordant sounds; light twinkles again and again, like the

moon between passing clouds; and before we have ceased to compute how many miles off it is, up rushes another train of waggons, with a lantern suspended from the foremost, and the boy in charge springs to the ground, unhooks the horse, and leads him away into the gloom on the left hand.

After a ten minutes' rest we begin to see a little, and gradually, very gradually, we make out that we are seated at one side of an immense tunnel or subterranean gallery, stretching right and left to unknown distances, opening immediately in front of us at the bottom of the shaft, and containing a tramway, along which the trains of waggons, loaded or unloaded, come and go. Above our heads, fixed to the black moist wall of slate or stone, whichever it may be, hang two great oil-lamps, the torches we had supposed to be at such a distance; and by their flaring light we see the man Jem, who invisibly led us from the cage, working away at his laborious task of sending up coal. We see, too, a constant stream of smoke creeping to the shaft, and passing up through it as through a chimney; for miners "*must breathe*," and while the pure fresh air is drawn in at one shaft, the warm foul air is got rid of through an-

other, and thus a complete system of ventilation is maintained.

Our eyes even yet are not accustomed to the gloom, but we have no time to waste, so we take a lighted candle, stuck in a piece of wood, which Old Robert hands to us, and follow him along the black gallery to the right. As the waggons roll past we stand still, and back close up to the wall, shrinking into the smallest possible compass, so terrible do they seem to us in our ignorance of the road and our uncertain vision. Robert, holding his candle over the train as it passes, discovers many a breach of rules; as, for instance, men lying on the waggons to save themselves the trouble of walking. The viewer administers a stern reproof; but we confess the offence does not seem to us a very dreadful one, though, of course, all disobedience or inattention to orders is wrong.

At times we come to a barrier of timber thrown across the gallery, with a door in it, hung so as to keep itself constantly shut. Behind each of these doors sits a boy to pull the string when men or waggons approach, and as soon as they have passed to let it close again. Any neglect of this seemingly trivial duty might occasion an interruption in the ventilation, and imperil the safety

of the mine. But what a weary life to sit there in the darkness all day long ! How can the boys employ their thoughts ? Do they think at all ?

At last we completely regain our sight, and with the help of our candles can discern the objects around us.

We have come along the main level or thoroughfare of the mine, where men and horses can walk without stooping ; a dreary cavernous way, yawning widely here and there into what seems to be huge abysses, but which, according to Old Robert, are abandoned workings. In some places, where masses of coal have fallen, the roof rises high into the darkness ; and stout timbers are set up to give support, or a strong stone wall is erected as an additional precaution. In some places roof and walls are firm and compact, and between wall and tramway is space only for a man to stand ; in others, great chasms on either side are partially filled with fallen rubbish. And again, there are places, as Old Robert takes care to point out, where air-channels solidly constructed of wood pass across the way overhead.

By-and-by we turn out of the main thoroughfare into a low and narrow branch level, where it is impossible to stand upright, and where the

waggon are drawn by ponies, and not by horses. Following this we come to the "broken," that is, the place where the miners are hewing coal ; and in all directions extend large black chambers and branching passages. Loose heaps of coal lie about, from which the waggon are loaded, and the ponies draw one short train after another along the crooked and uneven tram to the main gallery.

Here we see the hewer sitting on his haunches, and dislodging large lumps by the aid of his pick, or else boring a hole and loosening a mass by gunpowder. At intervals he leaves a huge square pillar to support the roof ; and when these have served their purpose he digs them away also, and the pressure from above topples in the roof, and the disembowelled place is thenceforth known as a "goy," or abandoned working.

"No wonder," says Mr. Walter White, "that miners strike for good wages ; no wonder that they maintain their strength with beef and mutton ; and regale themselves with 'singing-hinnies'—fat cakes baked on a girdle—on all fit occasions. Whatever may be their habits above ground, they are sober enough in the pit, where their only drink is water, milk, or tea. They have a strange appearance as they sit using their pick, black as

imps of darkness in the feeble light. Yet what says the song?

‘ The bonny pit laddie, the canny pit laddie,
The bonny pit laddie for me, O !
He sits in his hole as black as a coal,
And brings the white siller to me, O !

‘ The bonny pit laddie, the canny pit laddie,
The bonny pit laddie for me, O !
He sits in his cracket, and hews in his jacket,
And brings the white siller to me, O ! ’”

There can be no doubt that in good times the miner can realize high wages ; and truly his toil is so difficult, and is carried on under such arduous conditions, that it deserves a liberal reward. It is sometimes said that the money earned so hardly is spent too freely ; but this is true, perhaps, of individuals rather than of a class. Many miners are men of intelligence and of some degree of culture, who make a wise use of their leisure and their means, and in their neat cottages keep with pride their little but well-chosen libraries. It is pleasant to know that the number of such men is regularly increasing.

We are now conducted by Old Robert across the loose heaps of coal to the extremity of the hewing, in order to inspect the so-called “trouble” which has stopped the progress of the works in

that direction. It proves to be the intrusion of a ridge or dyke of the rock known as basalt, and it strikes across the coal seam like a wall. The miner might as well ply his pick against a mass of solid iron as against this hard and compact rock. It is indeed a *trouble*; for it generally happens where a seam is cut in two by a wedge of basalt that the range is altogether interrupted, so that if the basalt be pierced, the coal is not found on the same level, but lies some feet lower.

We have now travelled about two miles. We could continue our explorations for another two or three; but as each scene is a repetition of the preceding, each dark passage and gloomy tunnel like their fellows, we shall add nothing to our stock of knowledge. We declare ourselves content, and retrace our steps, Old Robert pointing out to us the huge pillars left at regular intervals, making the mine appear like a succession of streets bordered by rows of detached blocks. We observe, too, that wherever coal is being worked there runs a tramway. Everything is done that can be done to economize labour. The pit in which we are pursuing our researches is two hundred and eighty-eight feet deep, but so well ventilated that nowhere do we suffer from any oppressive temperature;

and as no explosive gas has been found, naked candles are used in all the workings. The absence of gas is a sign of inferiority of coal, and the best coal is the most dangerous to be worked.

On emerging into the main way once more, we find ourselves able to discern every object with the utmost ease. Passing the shaft, we turn into a recess behind the wall where the two lamps hang, and confront the huge furnace fire. You might roast a couple of oxen at it—a roaring, blazing, red-hot mass, which is kept burning night and day, and serves to maintain a rapid and steady current of air from the mine.* A little further and we come to the stables, where between thirty and forty horses and ponies are comfortably accommodated and supplied with abundant food. Then we return to the shaft, seat ourselves in the cage, are hauled up to the surface, and step, well-pleased, into the glorious and genial light of day.

The pit we have been visiting is, you see, exceptionally safe; but *all* pits are more or less dangerous, and most of them are liable to inundations, the falling in of roof or walls, and the collection and explosion of noxious gases. The miner's occupation is, it must be admitted, one of

* The heated air rises, and the cold air then rushes in to fill its place; and in this way a constant stream or current is produced.

the most laborious and perilous by which man gains his daily bread.

Occasionally a pit takes fire; but the commoner enemy, and assuredly the more fatal, is an explosion of *fire-damp*.

Coal disengages from its crevices and fissures a combustible gas, known to chemists as carburetted hydrogen, which burns, when ignited, with a livid flame, very quietly, if it is quite pure, but detonating with a terrible crash when it is mixed with atmospheric air. When this carburetted hydrogen is emitted from the walls of the subterranean galleries, and mingles with the air of those gloomy and extensive passages, a single spark is sufficient to convert the coal-pit into a powder-magazine, which bursts and shatters a wide area of rock and mineral, and brings inevitable death to all the unfortunate miners within the range of its influence.

The moment this fire-damp ignites, a frightful explosion is heard; the hewers are blinded, hurled afar, crushed by the falling material. The disaster is awful in its suddenness; in a moment the galleries become so many chambers of death, and the unfortunate workers are stricken before they have time to think of safety.

Those who escape the direct effects of the explosion are choked by the poisonous gases which it originates ; they are burned to cinders by the scorching temperature which necessarily arises from their combustion ; the course of ventilation is interrupted ; the barriers are swept away ; the dykes are breached ; floods of water pour in on every side, and the whole mine becomes a terrible scene of desolation.

It is painful to think that these catastrophes are nearly always the result of inexcusable neglect ; for our miners nowadays are provided with lamps which do not and cannot ignite the explosive vapour formed by the union of the atmospheric air with the carburetted hydrogen. The invention of these safety-lamps, as they are appropriately called, is due to the great chemist and scientific philosopher Sir Humphrey Davy, the story of whose life, as of that of a benefactor of mankind, we propose to tell in the following pages. It was in 1815 that his attention was first directed to the subject, and he was induced to ask himself whether nothing could be done to prevent or lessen the awful waste of human life which annually took place in our collieries.

He began by minutely investigating the composition of the terrible fire-damp and its chemical qualities.

He found that it was, as we have stated, hydrogen, or pure inflammable air, in combination with charcoal or carbon; in other words, light carburetted hydrogen.

He found that it did not explode unless mixed with a considerable quantity of atmospheric air; that it was the least readily combustible of all the inflammable gases; in other words, it required the highest temperature to ignite it, for it could not be exploded or fired by red-hot charcoal or red-hot iron; and further, that it produced less heat when inflamed than any other inflammable gas, and consequently that the expansive effect from heat attending its explosion was also less.

Next, he ascertained that by mixing one part of carbonic acid,* or fixed air, with seven parts of an explosive mixture of fire-damp, *the explosive power of the latter was destroyed.*

Also, that in exploding the said mixture in a glass tube, one-fourth of an inch in diameter, and

* This is the gas given off by plants, which any person can detect in the atmosphere of a conservatory after it has been close shut for an hour or two.

a foot long, more than a second was required before the flame reached from one end to the other; that in tubes of one-seventh of an inch, opening into the atmosphere, explosive mixtures could not be fired; and that metallic tubes prevented explosion better than glass tubes.

Now a consideration of these facts led Sir Humphrey Davy to reflect that, as a *considerable* heat was necessary to influence the fire-damp, and as, in burning, it produced a *comparatively* small degree of heat, the effect of carbonic acid and azote, and of the surfaces of small tubes, in preventing its explosion, depended upon their cooling powers—upon their so reducing the temperature of the explosive mixture that it shall be no longer sufficient for its continuous inflammation.

We have endeavoured to make this statement as intelligible as we can for our young readers, in order that they may understand the *theory* of the safety-lamp—*how* it came to be constructed, and *why* it is a safety-lamp.

Reasoning as we have shown, Sir Humphrey Davy proceeded to ask himself whether it was possible to design a lamp in which the cooling powers of the azote or carbonic acid formed by the process of combustion, or the cooling power of

the apertures through which the air passed in and out, should absolutely prevent the communication of explosion. If so, the miner would be provided with a light by which he could prosecute his arduous labour, and at the same time enter any gallery where the fire-damp had collected, without fear of the result.

After several experiments, the lamp was made, and made thus :—

The flame was enclosed in a cage or cylinder of thin metallic gauze, whose apertures did not exceed one twenty-second of an inch square.* This cylinder was protected by three external, strong, upright wires, meeting at the top; and to their point of junction a ring was attached, by which the lamp was suspended. The oil was supplied to the interior by a pipe projecting from the outside, and the wick trimmed by a wire bent at the upper end, so that it was not necessary to move the gauze for this process. The whole apparatus measured two inches in diameter.†

When a lighted lamp of this kind is introduced into an explosive current of air and fire-damp, the flame is seen gradually to enlarge as the proportion of light carburetted hydrogen increases, until at length it fills the entire gauze cylinder. This

* Draw or cut out on paper a square inch, and mark it off into twenty-two equal parts; each part will represent the size of the apertures in the metallic gauze cylinder.

† It is right to state that a similar lamp was invented about the same time by George Stephenson; but Davy's is the one, with some modifications, now in use.

is a warning to the miner to retire to a place of safety until the current has spent itself; for, though no explosion can occur while the gauze remains sound, the heat rapidly oxidizes the metal, so that it is apt to break, and a single aperture of sufficient size would then occasion a destructive explosion. Fore-warned, however, is fore-armed, and Sir Humphrey Davy by his invention neutralized one of the greatest dangers—perhaps *the* greatest—which can befall the worker in his dreary toil under ground. And if we accord our praise to famous conquerors, whose victories have been won only at an awful cost of human life, God's precious and inestimable gift, how much more heartily ought we to bestow our grateful admiration on the peaceful philosopher, whose triumph over an enemy so subtle and so fatal as the fire-damp has saved many a father for his children, many a son for his widowed mother.

“An invisible and impalpable barrier made effectual against a force the most violent and irresistible in its operations, and a power that in its tremendous effects seemed to emulate the lightning and the earthquake, combined within a narrow space, and shut up in a net of the most slender texture, are facts which must excite a degree of wonder and astonishment, from which neither ignorance nor wisdom can defend the beholder. When to this we add the beneficial

consequences and the saving of the lives of men, and consider that the effects are to remain as long as coal continues to be dug from the bowels of the earth, it may fairly be said that there is hardly in the whole compass of art or science a single invention of which one would rather wish to be the author." *

In October 1817 the coal-owners and colliers of the north of England presented the inventor of the safety-lamp with a testimonial, consisting of a service of plate, valued at £2500. In the address which accompanied it occurred the following observations :—

“ You have increased the value of an important branch of productive industry ; and, what is of infinitely more importance, you have contributed to preserve the lives and persons of multitudes of your fellow-creatures.

“ It is now nearly two years that your safety-lamp has been used by hundreds of miners, in the most dangerous recesses of the earth, and under the most trying circumstances. Not a single failure has occurred. Its absolute security is demonstrated. We have indeed deeply to lament more than one catastrophe, produced by fool-hardiness and ignorance, in neglecting to use the safeguard you have supplied ; but these dreadful accidents even, if possible, exalt its importance.

“ If your fame had needed anything to make it immortal, this discovery alone would have carried it down to future ages, and connected it with benefits and blessings.”

We now turn from the consideration of coal

* Professor Playfair, *Edinburgh Review*, 1816.

and coal-mines to trace the principal incidents in the life of a man of singular ability, industry, determination, and perseverance, who, by the exercise of these qualities, rose from a comparatively obscure condition to become one of the most illustrious of European philosophers. Hitherto we have alluded to Sir Humphrey Davy simply as the inventor of the safety-lamp; but the additions which he made to our scientific knowledge would alone have rendered his name immortal. He discovered the various combinations of the gases oxygen and nitrogen, and the chemical changes which metals undergo in the production of galvanic influence. He laid the foundations of a new science—that of electro-chemistry. We owe to his remarkable genius the discovery of potassium and sodium, and of the decomposition of alkalies by means of galvanism. His close and accurate observation of nature has recorded many facts of the highest interest in his “*Salmonia*” and “*Consolations in Travel*.” He first made known the peculiar properties of nitrous oxide, or laughing-gas, now frequently used instead of chloroform as an anæsthetic. These are the claims of the Penzance apothecary’s apprentice—for in that capacity he

began his career—upon the admiring gratitude of posterity; and these are claims which an enlightened world will gladly recognize when the false glory of victorious battle-fields is utterly forgotten.





CHAPTER II.

SIR HUMPHREY DAVY'S EARLY YEARS.

WE regard the life of Sir Humphrey Davy as a remarkable instance of what may be accomplished by steady devotion to one good and honourable aim. Too many persons frit away their powers upon half-a-dozen different objects, and go down to their graves with their work undone, having effected little or nothing for the benefit of themselves, their neighbours, or their race. It is by concentration of power that great results are attained in the moral as in the material world. The charge of gunpowder that will remove a mass of rock will scarcely disturb a pebble if spread over too wide a surface ; and therefore Sir Fowell Buxton was quite right in saying : "The distinction between the weak and the powerful, the great and the insignificant, is energy, invincible determination—a purpose once fixed,

and then *death or victory* ! That quality will do anything that can be done in this world ; and no talents, no circumstances, no opportunities will make a two-legged creature a *man* without it."

As we have written elsewhere, it is more particularly in the lives of men who have perfected great inventions, who have completed mechanical processes for multiplying results while economizing labour, or who have been animated by an insatiable thirst after knowledge, that we see the advantages of a fixed and unwavering aim, of work with a purpose. Days of toil and nights of meditation have been gladly sacrificed by men like these, that their one high and sacred object might be secured. They have permitted no obstacles to stay their progress ; they have allowed no misgivings to weaken the stalwart arm. In want and sorrow, in domestic trial, in individual suffering, they have kept ever before them their settled resolve, always confident and hopeful that in the fulness of time the light and glory of success would stream through the clouds above them. The earnest mind refuses to be turned aside by difficulties or doubts. It is as little influenced by the ridicule of the ignorant as by the warnings of the sceptical. It has hope and it has faith: hope

in the benevolence of God the Father ; faith in its mission and in its object. So the crown of victory, sooner or later, here or hereafter, rewards their enthusiasm, even though the world may grant them a tardy and a scanty recognition. But the true, honest, genuine worker cares nothing for the world or its prizes. He does not labour to gain the applause of the multitude, or the vulgar signs of "success in life" which delude the thoughtless. If they come in his way, he does not despise them ; but he does not seek them. He toils and strives under a loftier inspiration and for a purer recompense—the consciousness of having lived holily, the sweet delight of labour, the exquisite felicity of knowledge. No generous soul will respond to the foolish query, "What will the world say?" Knowledge, like virtue, is its own reward ; and to the high-minded worker no greater gratification can there be than to have deserved well of his fellows, and to have aided, however so little, the onward march of humanity. "Some men think," says Lord Bacon, "that the gratification of curiosity is the end of knowledge ; some, the love of fame ; some, the pleasure of dispute ; some, the necessity of supporting themselves by their knowledge ; but the *real use* of all know-

ledge is this, that WE SHOULD DEDICATE THE REASON GIVEN US BY GOD TO THE USE AND ADVANTAGE OF MAN."

Sir Humphrey Davy, the eldest son of Robert and Grace Davy, was born at Penzance, in Cornwall, on the 17th of December 1778. His father, a carver in wood, was a man of excellent character and considerable ability. Humphrey was not less fortunate in his mother, whose good sense was equalled by her amiability of disposition. His childhood, therefore, was happily spent, and his faculties were carefully and prudently developed. Before he had learned his letters, he could repeat from memory numerous little prayers and stories which he had learned by hearing them recited; and before he had acquired the "mystery of penmanship," he amused himself with copying the figures in Æsop's "Fables," which, with the "Pilgrim's Progress," were his favourite reading. At an early age he showed a remarkable facility in composing verses, and when scarcely five years old wrote some pleasant rhymes, which he spoke in the course of a little Christmas entertainment.

As soon as he was old enough, his father sent

him to a respectable boarding-school in Truro, kept by a Dr. Carthew, who seems, on the whole, to have been a judicious, though a somewhat severe master. Here he distinguished himself above his fellows, quite as much by his energy and application as by his natural gifts. He was very popular in the school ; partly from the readiness with which he wrote Latin and English verse, and the good nature with which he assisted those who could not,—partly from his excellence as an impromptu story-teller and romancist. It is recorded that he was exceedingly partial to angling, an amusement to which he continued addicted throughout his busy life ; and that he was especially skilful in making fireworks. The love of Nature, which was always a predominant passion with him, manifested itself in his earliest years ; and nothing afforded him greater pleasure than a ramble by the sea-shore, or an excursion into the romantic scenery lying between Penzance and Truro. The neighbourhood in which he lived was eminently calculated to foster this pure and delightful taste. The variety of its landscape and seascape is only surpassed by its beauty. The ever-changing sea ; the delightful curve of Mount's Bay, and its rocky gem, St. Michael's Mount—

“Whose brow
Is crowned with castles, and whose rocky sides
Are clad with dusky ivy ;”

the romantic leafy glen, watered by the crystal stream ; the furze-blooming hill ; the sheltered valley ; the open sunny meadow ; the ample orchard,—all these combine to form many a gracious and attractive picture.

In 1794, Davy was unfortunate enough to lose his father ; and in the year following his mother apprenticed him to Mr. Borlase, a surgeon in Penzance, afterwards well known as a local antiquary. He then began a course of well-regulated study in theology, botany, logic, physics, and the usual subjects of his profession, which he pursued with considerable ardour ; and the note-books which he kept at this time show that his mind was profoundly occupied with the most important points of religious inquiry. These graver pursuits he occasionally relieved by the practice of poetical composition, in which he attained a considerable degree of elegance, as the following brief extract proves :—

THE TEMPEST.*

The tempest has darkened the face of the skies,
The winds whistle wildly across the waste plain,

* These verses appear to have been written in 1796, when he was seventeen years old.

The fiends of the whirlwind terrific arise,
And mingle the clouds with the white-foaming main.

But though now all is murky and shaded with gloom,
Hope the Soother soft whispers the tempest shall cease;
Then Nature again in her beauty shall bloom,
And enamoured embrace the fair sweet-smiling Peace.

For the bright blushing morning, all rosy with light,
Shall convey on her wings the Creator of Day;
He shall drive all the tempest and terrors of Night,
And nature, enlivened, again shall be gay.

If the tempest of Nature so soon sink to rest;
If her once-faded beauties so soon glow again;
Shall Man be for ever by tempest oppressed,—
By the tempest of passion, of sorrow, and pain?

Ah, no! for his passions and sorrows shall cease
When the troublesome fever of life shall be o'er;
In the night of the grave he shall slumber in peace,
And passion and sorrow shall vex him no more.

This is not poetry, but it is correct and graceful verse, the effusion of a cultivated mind.

The science which he most loved, and for whose successful pursuit he was admirably fitted by the peculiar character of his intellect, was chemistry, and about 1797 he entered upon its study with the utmost ardour. At first, he had neither fitting apparatus nor competent instructor. His two authorities were Lavoisier's "Elements of Chemistry" and Nicholson's "Dictionary of Chemistry;" his apparatus consisted of phials, tobacco-pipes, wine-glasses, tea-cups, and earthen

crucibles ; while his materials were chiefly the mineral acids and the alkalies, and the common drugs used in medicine. His progress, however, was extraordinarily rapid, and in the course of a few months he was able to conduct a correspondence with Dr. Beddoes on such abstruse subjects as Light and Heat. And in 1799 he published the results of his experiments in a volume of "Essays."

At this time he derived great intellectual profit from his conversations and correspondence with two men of superior acquirements, Gregory Watt and Davies Gilbert. Our hero was wise enough, as we hope our readers will be, to choose as his friends men from whom he could learn, whose intellect could quicken and feed his own, and from whose stores of knowledge he could make good his deficiencies.

At the age of twenty, Davy's intellectual wealth may be represented thus : From his school education he had gained a tolerable acquaintance with Latin and Greek ; since leaving school, he had taught himself French, so as to read works in that language with perfect facility, and to speak it fluently ; he had mastered the rudiments of mathematics ; he had disciplined his mind in metaphysical discussion ; he had made good progress

in his professional studies ; he had grounded himself thoroughly in chemistry ; and his miscellaneous reading had been extensive. Among the books he had made his own by patient perusal were : Locke's, Reid's, and Stewart's "Essays," Enfield's "History of Philosophy," Rollin's "Ancient History," Gibbon's "Decline and Fall of the Roman Empire," "History of Modern Europe," Hume's "Essays" and "History of England," Thomson's "Seasons," Milton, and Shakspeare. We wish every young man of twenty could give so satisfactory a proof of judicious and well-regulated study.

There is no doubt that he now began to gain confidence in his intellectual powers, and to desire that they should be devoted to a noble purpose. He was urged forward by an honourable thirst of distinction, a love of knowledge for its own sake, and the hope of accomplishing some work by which mankind might profit. With such motives to animate him, we need not wonder that his onward progress was so rapid and continuous. In one of his private note-books he wrote : "I have neither riches, nor power, nor birth to recommend me ; yet, if I live, I trust I shall not be of less service to mankind and to my friends than if I

had been born with these advantages." The young student who could cherish such a sentiment was evidently marked out for much good and useful labour.

In 1798, Dr. Beddoes offered him an appointment peculiarly congenial to his tastes—that of superintendent of the "Pneumatic Institution," which had been established at Clifton for the purpose of testing the medicinal effect of different gases. His foresight convinced him that this was the first step of the ladder he so ardently longed to climb; and on the 2nd of October, before he was quite twenty years old, he left his home to enter upon what proved a brilliant and successful career. At Clifton he quickly earned the respect and friendship of all who came into contact with him, and was soon able to number among his intimates the poets Southey and Coleridge, and other men of culture and intellect. It was here that he discovered the peculiar properties of nitrous oxide or laughing-gas; a discovery which at once gained him a foremost place among contemporary physicists, and established his character as a chemical philosopher. The work embodying the results of his investigations was published in 1800, and immediately attracted the attention of the world of

science. Here, too, he prosecuted the most delicate and difficult experiments on the decomposition of acids and alkalies; and we find him meditating two great works—one on the “Laws of Corpuscular Motion,” and the other on the “Theory of Passion.” With all this he found time to attend to his duties at the Pneumatic Institution, which flourished exceedingly, and was crowded with patients. His life was a life of incessant activity, such as few young men of his age either would or could live; a life whose very enjoyments were more or less of an intellectual character, from verse-writing to fly-fishing; and a life distinguished by spotless personal purity and an entire freedom from mean and unworthy passions. Moreover, it was a happy life, as such a life deserves to be, and always is. The secret of happiness is nothing more than *useful work conscientiously done!*

His reputation as a chemist was so widely spread, that when the honourable and important post of Professor of Chemistry at the Royal Institution of London fell vacant, towards the close of 1800, it was offered to Davy in the most flattering manner: and thus, in his twenty-second year, he found himself in possession of an appointment of the most eminent distinction, with an annual income of not less than

£500. For a year and a half he acted, owing to various causes, simply as assistant lecturer and director of the laboratory, but he was formally installed in the professorship in May 1802. His lectures on scientific subjects immediately attracted large audiences, and in a few months he was one of the most popular savants in the metropolis. We are told that men of the first rank and talent, the literary and the scientific, the practical and the theoretical, blue-stockings and women of fashion, the old and the young, all crowded to his lecture-room. They were attracted and delighted by his wonderful gift of exposition, his youth, his simplicity, his natural eloquence, his chemical knowledge, his happy illustrations, and his ingenious experiments. Then again they were impressed by his evident earnestness. If he entertained them, it was because he had the power of investing even the dullest subjects with a peculiar charm; but his primary object was to instruct, and there was such a fervency, such an enthusiasm in his love of knowledge, that it became contagious, and those who went at first for the sake of amusement, remained in order that they might learn.

He commonly wrote his lecture, his biographer tells us, the day before he delivered it. On the

lecture day he dined in his own room, and made a light meal on fish. As he was thoroughly master of his subject, he wrote with great rapidity, and with the fullest confidence that his powers would not fail him. He was careful always to rehearse, with his assistants, the experiments he intended to perform; carrying out in everything the wise rule, that what has to be done ought to be done as well as possible. He would even mark in his manuscript the words which required emphasis; he studied the effect of intonation; often he repeated a passage two or three times in different ways, until he was satisfied that its meaning was clearly and distinctly given. He knew that success is only to be obtained by the minutest attention to details; and as he shrank from the thought of failure, he did not hesitate to give the necessary degree of preparation.

His manner as a lecturer was perfectly simple and natural; there was no affectation in his gestures or attitude; he was energetic, but never theatrical. Probably the great attraction of his oratory was its impressiveness; it was evident he wished his hearers to know what he knew, and to find in that knowledge the pleasure he himself found. His experiments were devised on

the principle, not of amusing and astonishing his audience, but of illustrating and explaining his discourse; of demonstrating either important properties of bodies, or the manner and results of their chemical action; he was careful they should not appear to have been introduced for the purpose of displaying the lecturer's dexterity of manipulation, or to excite wonder, however brilliant and wonderful they really were. He was, in fact, the first of that succession of philosophical experimentalists whose fame, in our own day, is worthily upheld by Tyndall and Huxley. As for his eloquent declamation, which seemed to rise spontaneously to his lips, when he came to speak of the beauty and order of Nature, and the majesty of the works of the Creator, it derived its effect from its sincerity. It was evident that he *felt* what he said; that he was expressing feelings which could not be restrained, and not giving utterance merely to the usual common-places.

Meantime, in the laboratory of the Royal Institution he carried on his experiments and pursued his researches with an unfailing ardour. They were rewarded with discoveries of more than ordinary importance. The room was spa-

cious, well ventilated, lighted from above, and supplied copiously with water. It was divided into two compartments of nearly equal size : one, the laboratory proper ; the other, a kind of theatre, provided with seats for the accommodation of the students of practical chemistry. The apparatus most conspicuous and most in use were : a sand-bath, for chemical purposes, and for heating the room ; a powerful blast furnace ; a movable iron forge, with a double bellows ; a blow-pipe apparatus, attached to a table, with double bellows underneath ; a large mercurial trough, two or three water pneumatic troughs, and various galvanic troughs ; gasometers, filtering stands, vessels of glass and earthenware, retorts, crucibles, balances, and air-pumps. These were the spells with which the young magician wrought his wonders !

The laboratory was a scene of the most enthusiastic and indefatigable labour, and here Davy spent a great part of every day that he was in town and at leisure. Even in his absence the experiments were continued, his assistants following out the directions he clearly and concisely gave ; and when he returned he finished them, or noted the results. He left nothing to memory,

which often betrays us when most we depend upon it: an entry was made in a large book, kept for the purpose, of all that occurred, written either by himself, or by an assistant from his dictation; and thus his scientific progress was faithfully registered, day by day, week by week, month by month, and it was easy to see how much had been accomplished in any particular direction.

“I can never forget his manner,” says his brother, “when occupied in his favourite pursuit; his zeal amounted to enthusiasm, which he more or less imparted to those around him. With cheerful voice and countenance, and a hand as ready to manipulate as his mind was quick to contrive, he was indefatigable in his exertions. He was delighted with success, but not discouraged by failure; and he bore failures and accidents in experiments with a patience and forbearance, even when owing to the awkwardness of assistants, which could hardly have been expected from a person of his ardent temperament. And his boldness in experimenting was very remarkable: in the operations of the laboratory danger was very much forgotten, and exposure to danger was an every-day occurrence. Considering the risks run, and the few, if any, precautions taken against accidents, it is surprising how small a number of injuries were received. The only two serious wounds that I recollect he sustained, were in the hand and eye: the one, from receiving on his hand a quantity of melted potash; the other, from an explosion of a detonating compound.”

Davy employed his vacations in making excur-

sions—rambling over most parts of England, over the Highlands of Scotland, then not so well known to English tourists as they now are, and venturing as far as Ireland and the Hebrides. He had a genuine love of Nature, and felt as keen a delight in surveying a beautiful landscape as in making some new and happy experiment. He did not content himself with gratifying his eye, however, but endeavoured to cultivate his mind; studying the geology of the various districts he visited, their soil, their products, and their agriculture. He was a great adept at asking questions; and hence he accumulated stores of information, when most men would have travelled “from Dan to Beersheba” and pronounced the whole country barren.

As a proof of the manysidedness and acuteness of his intellect, we may refer to the improvements he introduced into tanning. It was one of the first subjects of inquiry he took up after his appointment to the Royal Institution, and he entered into its investigation with his characteristic energy. He visited every tan-yard near London, made the acquaintance of practical tanners, and experimented vigorously and assiduously in his laboratory. Had he intended to

make tanning his profession, he could not have pursued it with greater eagerness. He writes to his mother, in one of his lively letters :—

“I saw Mr. William Bolitho and his two brothers-in-law yesterday, and they breakfast with me to-morrow. We are all fellows of the same craft ; they are great practical tanners, and I am a theoretical one. By-the-by, I have ascertained some facts relative to tanning which I hope will be really useful.”

These facts he published in 1803, in an essay entitled “An Account of some Experiments and Observations on the Constituent Parts of Certain Astringent Vegetables, and on their Operation in Tanning.”

It is needless to say that in this inquiry he had no view to pecuniary advantage. Yet one present he *did* receive ; not, indeed, in acknowledgment, but in proof of the valuable assistance he had rendered to the practical tanner—namely, a pair of shoes, one made of leather tanned by oak-bark, in the old way, and the other, as he had suggested, by catechu. He wore these with much satisfaction ; the catechu leather proving equal in quality to the oak-bark leather, while it was cheaper in preparation.

Discovery—the advancement of knowledge—the progress of science—had for Humphrey Davy,

as it will have for all noble minds, an infinitely greater attraction than gain; and he seems to have held that his duty was done when he had suggested the application of a scientific truth or principle to the arts of life. He felt, with Lord Bacon, that "the applying of knowledge to lucre diverts the advancement of knowledge, as the golden ball thrown before Atalanta, which, while she stoops to take up, the race is hindered."

"Declinat cursus, aurumque volubile tollit."

She turns aside from her swift course to seize
The fleeting gold!

In 1803, Davy added to his other avocations that of Lecturer to the Board of Agriculture. His success in this capacity was a remarkable proof of the readiness with which he turned his industrious and powerful intellect to any subject. He continued this series of lectures until 1813.

While we admit, however, Davy's wonderful capacity and admirable perseverance, it must be owned that he met with an unusual degree of prosperity. As one of his biographers observes: It is scarcely possible to picture to ourselves a being upon whom Fortune ever showered more favours than upon Davy, during this golden period

of his career. Independent in an honourable competence, the product of his genius and industry ; resident in the centre of all scientific information and intelligence ; every avenue of knowledge and every mode of observation open to his unwearied intellect, he must have experienced a satisfaction which few philosophers have ever before felt,—the power of pursuing experimental research to any extent, and of commanding the immediate possession of all the means it might require, without the least regard either to cost or labour. What a contrast does this picture afford to that which has been too faithfully represented as the more usual fate of the philosopher and man of letters, and which exhibits little more than the unavailing struggles of genius against penury ? Instead of a life wasted in fruitless waiting for patronage and reward, for friends and honour, we see Davy, in the flush of his reputation, courted by all whom rank, talent, or station had rendered conspicuous.

The young reader, therefore, must be warned against expecting that his talents or his industry will unfailingly secure him such a measure of success as Davy obtained ; nor must he allow himself to be actuated by the vulgar motive of

“bettering his condition.” Knowledge is to be pursued for her own sake. Yet it may confidently be asserted that, on the whole, industry and energy *do* meet with their reward, even in this world, if they be guided by prudence, and directed towards an honourable object. A sudden leap into fortune and prosperity is, however, the lot of few. We must move steadily and surely, and in the end we shall not miss our goal.

In 1806, Davy's scientific renown reached its climax in his discovery, through the agency of galvanism, of the valuable metals potassium and sodium. The former he obtained by bringing galvanic action to bear upon moistened potash, securing the decomposition of its component parts. It is said that when he saw the minute globules of potassium burst through the crust of potash, and ignite as they entered the atmosphere, he could not contain his joy; he actually bounded about the room in his ecstasy, and some little time elapsed before he felt calm enough to continue his experiment.

The importance of these discoveries will be understood by the young chemist, when we remind him that they proved that the bases of the

fixed alkalies, which had never before been decomposed, were metallic.

His exertions, added to his intense enthusiasm, brought on a dangerous attack of fever. He was confined to his bed for nine weeks, and at one time it was feared that his illness would have a fatal result. Happily he was spared to work some years longer for the benefit of humanity, and to consecrate his brilliant genius to the service of Science.

The following extract from a poem, "written after recovery from a dangerous illness," will show that during his arduous chemical labours he never wholly forgot his early devotion to the Muse. It has been said of him, that if he had not been a great philosopher, he would have been a great poet. This we take leave to doubt. Of the powerful imagination and exquisite feeling for melody which are among the poet's highest gifts, Davy possessed little; but his verse is always refined and graceful, and may be read with pleasure as another illustration of the versatility of his talents:—

Lo! o'er the earth the kindling spirits pour
The flames of life that bounteous Nature gives;
The limpid dew becomes the rosy flower,
The insensate dust awakes, and moves, and lives.

All speak of change: the renovated forms
Of long-forgotten things arise again;
The light of suns, the breath of angry storms,
The everlasting motions of the main.

These are but engines of the Eternal Will,
The One Intelligence, whose potent sway

Has ever acted, and is acting still,
 Whilst stars, and worlds, and systems all obey;

Without whose power, the whole of mortal things
 Were dull, inert, an unharmonious band,
 Silent as are the harp's untuned strings
 Without the touches of the poet's hand.

A sacred spark created by His breath!
 The immortal mind of man His image bears;
 A spirit living 'mid the forms of death,
 Oppressed, but not subdued, by mortal cares!

A germ, preparing in the winter's frost
 To rise, and bud, and blossom in the spring;
 An unfledged eagle by the tempest tost,
 Unconscious of his future strength of wing.

The child of trial, to mortality
 And all its changeeful influences given;
 On the green earth decreed to move and die,
 And yet by such a fate prepared for heaven.

It must be owned that these verses are smoothly and pleasantly written; that the ideas are elegant and the images correct. In fact, they are as much better than most men write, and especially men of science, as they are unquestionably below the standard of *true* poetry. Davy was a man of varied culture, but, as we have said, he was not a poet.





CHAPTER III.

DAVY'S MANHOOD.

THE next important work undertaken by our illustrious chemist was an investigation into the nature of sulphur and phosphorus ; which was followed up by an inquiry into the properties of the acids, and some curious and original experiments upon chlorine.

Up to Davy's time, certain acids well known to be compounds—namely, the boracic, muriatic, and fluoric—had resisted every effort to accomplish their decomposition and detect the bases on which they were founded. Davy, however, brought into requisition the magical power of the galvanic battery, and ascertained that boracic acid was composed of boron and oxygen. Muriatic acid gas was formed, he found, by the union of oxymuriatic acid with hydrogen ; and certain characters distinguishing it seeming utterly inconsistent with

its old and popular name, he proposed that it should thenceforth be known as Chlorine, a name derived from the colour of the gas.

In 1810 and 1811, he delivered by special request courses of lectures to the Royal Society of Dublin; and visited many parts of Ireland, in whose scenery he took great delight.

In 1812, his brilliant services to Science were recognized by the Prince Regent, who bestowed on him the honour of knighthood. In the same year, on the 11th of April, he married Mrs. Apreece, the widow of S. Ashby Apreece. This lady was the daughter and heiress of Charles Kerr, of Kelso, Esq., and possessed a very considerable fortune. He then retired from his various public appointments, with the intention of devoting his leisure to the private cultivation of his favourite scientific studies. This step has been severely criticised by some of his biographers; and though it was most assuredly not taken with any intention of abandoning the pursuit of science, which had so richly recompensed him, or of relaxing in his efforts to promote its interests, we fear Dr. Paris is justified in asserting that other views of ambition had opened upon his mind; that as his wealth increased, and his social position was elevated, his

feelings became more aristocratic—he discovered charms in rank which had before escaped him, and no longer viewed patrician distinction with philosophic indifference. We must regret his weakness, though it is one to which most of us are prone. We must regret his weakness ; but in so great a man some blemishes may be pardoned.

Not long after his marriage he published his “Elements of Chemical Philosophy.” He had begun it in the autumn of 1811, prior to his second visit to Ireland, and it was pleasantly associated with his courtship of Lady Davy. He commenced to print it almost as soon as he commenced to write it. He made no fair copy of his manuscript, but sent it direct to the printers ; yet the published work shows no sign of haste or carelessness.

Sir Humphrey was in the habit of keeping a note-book, in which he jotted down any thoughts that occurred to him, either during his reading or in his hours of meditation. A few of these reflections may here be given, not only on account of their own excellence, but as illustrative of the peculiar bias of his mind :—

“A man should be proud of honours, but not vain of them.” A happy distinction ; for while all kinds of vanity.

are contemptible, some forms of pride are to be warmly commended.

“The grandest as well as the most correct views are those that have been gained by minute observation, and by the application of all the more precise and accurate methods of science.” This is a truth on which young learners will do well to ponder, for they are too apt to fancy that in patient work there is no credit, and that to jump at conclusions, and judge hastily on imperfect data, is a sign of intellectual vigour. Whereas it is a sign only of intellectual conceit.

“The brood of the eagle, like that of the bird of night, is at first dazzled and pained by the light of the sun ; but the one will not cease to look towards it till they can rejoice in its splendour,—the other uniformly avoids its glorious rays.”

“In the Christian religion, the pleasures as well as the pains of a future life, though inconceivably great, have yet their means and their end concealed in mystery. The indefinite, the strongest source of high interest, is perpetually called up in the mind. ‘Eye hath not seen, nor eye heard, neither hath it entered into the heart of man to conceive the joys that he hath prepared for those who love him.’ Sublimity is the characteristic of the future state in the religion of Jesus. The highest degree of hope or of fear must be awakened by it. The objects are grand, indefinite ; and they are therefore most perfectly calculated to occupy the faculties of a being whose capacity of mental enjoyment and suffering, of improvement and degradation, appears without bounds. Of all the religions which have operated upon the human mind, Christianity alone has the consistent character of perfect truth ; all its parts are arranged with the most beautiful symmetry ; and its grand effects have been constantly connected with virtuous gratification, with moral and intellectual improvement, with the present and future happiness of man.”

In 1813 we find him actively engaged in

chemical experiments, especially in connection with the properties of fluorine. Towards the close of the year he and Lady Davy started on a Continental tour, accompanied by Mr. Faraday (afterwards not less distinguished as a chemist than his patron), whose abilities he had detected, and whose love of scientific pursuits he had fostered. At Paris he made the personal acquaintance of several distinguished philosophers,—Clement, Desormes, Gay-Lussac, Von Humboldt, Berthollet, Vauquelin, Laplace. Thence he travelled through the south of France and Italy. If he made any notes of this interesting journey, they are no longer extant; but some poetical memorials remain, which show how vividly he was impressed by the beauty and associations of the famous scenes he traversed.

Thus, on his first view of Mont Blanc, which he saw from Lyons, clothed in the purple twilight of a January evening, he wrote :—

With joy I view thee, bathed in purple light,
Whilst all around is dark ; with joy I see
Thee rising from thy sea of pitchy clouds
Into the middle heaven,—
As if a temple to the Eternal, raised
By all the earth, framed of the pillared rock,
And canopied with everlasting snow !—
That lovely river, rolling at my feet
Its bright green waves, and winding 'midst the rocks
Brown in their winter's foliage, gained from thee
Its flood of waters ; through a devious course,

Though it has laved the fertile plains, and washed
 The cities' walls, and mingled with the streams
 Of lowland origin, yet still preserves
 Its native character of mountain strength,—
 Its colour, and its motion. Such are those
 Amongst the generations of mankind
 To whom the stream of thought descends from heaven,
 With all the force of reason and the power
 Of sacred genius. Through the world they pass
 Still uncorrupted, and on what they take
 From social life bestow a character
 Of dignity. Greater they become,
 But never lose their native purity.

There can be no question that Sir Humphrey felt a genuine pleasure in thus recording his impressions in polished verse, and that the occupation agreeably relieved his severer pursuits, and accustomed him to look at Nature with a poet's vision. That his faculty of observation was keen and carefully cultivated, the following extract will show. He went from scene to scene with eye intent upon their different features. Nothing escaped his notice, and the minuteness with which he marked the details enhanced the admiration with which he contemplated the whole. It is not enough to be aware of a gratified sensation when we look at a fine landscape, and exclaim, "How beautiful!" We must inquire in what consists its beauty; in what it differs from other landscapes; what is its special character; what constitutes its peculiar charm.

The air is soft as in the month of June
 In northern climes; a balmy zephyr blows,
 And nothing speaks of winter's harshest month*
 Save that the trees are leafless, and yon Alps,—
 Not, as in summer, merely capped by snow,
 But deep incased, and girt around with ice.
 Upon the mountains crowded round thy banks,
 O lovely Rhone! no ice, no snows are seen,

* These lines were written on the 6th of January.

But lively tints and varied, such as might
Bespeak autumnal days. The oak, that long
Has kept its faded foliage, clothes thy base,—
The bracken to their sides a richer tint
Of chestnut gives, and the green herbage clothes
Their summits bathed in dew ; save where the cliff
Uplifts its marble crest of hue diverse
And varied outline, gray with moss, or blue,
In native colouring ; or, changed by time,
And rusted by the active elements,
More lovely in decay,—assuming forms
Of broken columns, and of mouldering towers.

We cannot deny ourselves another quotation, which illustrates very vividly the wide culture of Davy's philosophic mind. And it is to this breadth of culture we would direct the reader's attention, as something which he too should strive to attain. The mind, if confined to one narrow groove, will lose a considerable portion of its powers, and a considerable portion also of its pleasures. It must be trained to find a delight in the contemplation of Nature, as well as in the study of the works of the wise. It must find an inspiration in art as well as in science, in poetry no less than in physics ; it must seek knowledge everywhere, and make all knowledge minister to its exaltation and its happiness. It is said of the elephant's trunk, that it can pick up a pin or topple to the ground an oak. In like manner, the well-trained mind will appreciate the smallest detail, and grasp the largest generalization ; will value the perfection of the grain of sand on the shore, and the majesty of the mountain which hides its crest among the clouds. While keeping steadily before you, reader, one fixed aim as the pole-star which directs your course in life, do not fear to look around you on every side as you continue your onward and upward progress, and on every side you will find materials for reflection ; on every side you will find something, the study of which will make you a wiser and a better man.

Now let us read Sir Humphrey Davy's eulogium on the Mediterranean Pine :—

Thy hues are green as is the vernal tint
 Of those fair meads * where Isis rolls along
 Her silver floods. And not amongst the snows,
 Nor on the hoary mountain's rugged crest,
 Is thy abode ; but on the gentle hill,
 Amongst the rocks, and by the river's side,
 Rises thy graceful and majestic form,
 Companion of the olive and the vine,
 And that Hesperian tree whose golden fruit
 Demands the zephyr warmed by southern suns.
 In winter thou art verdant as in spring,—
 Unchangeable in beauty, and thy reign
 Extends from Calpe to the Bosphorus.
 Beneath thy shade the Northern African
 Seeks shelter from the sunshine ; and the Greek,
 In Tempe's vale, forms from thy slender leaves
 A shepherd's coronal. Fanes of the gods
 Of Egypt and of Greece majestic rise
 Amidst thy shades ; and to the memory,
 O lovely tree ! thy resting-places bring
 All that is glorious in our history,—
 The schools where Socrates and Plato taught—
 The rocks where Grecian freedom made her stand—†
 The Roman virtue—the Athenian art—
 The hills from which descended to mankind
 The light of faith—from which the shepherd gave
 The oracles of Heaven, and Israel saw
 The sacrificial offering of her guilt,
 The blood of the atonement, shed in vain,
 Where Salem fell, and her offending race
 Were scattered as the dust upon the blast.

It was not a love of Nature only that actuated Sir Humphrey Davy in his Continental explorations ; he was desirous of extending his scientific

* The meadows of Oxfordshire.

† Thermopylæ

knowledge. Therefore from Paris he travelled direct into Auvergne, to examine the Pay de Dôme and the extinct volcanoes of that remarkable region. Thence he proceeded to Montpellier, where he carried on a series of experiments on the various combinations of iodine. By way of Nice and the Col di Tende he crossed into Italy, and through Turin, hastened on to Genoa, the "City of Palaces," where he took the opportunity of studying the electricity of the torpedo fish. Both here and at Montpellier he collected, and minutely examined, many of the curious marine productions of the Mediterranean coast. At Florence and at Rome his ever active mind took up a new subject of inquiry; namely, the nature of the diamond, and of the different varieties of carbon, or charcoal. The results at which he arrived,—indicating that the diamond contains no new and peculiar principle, that it is merely crystallized carbon, and that the common varieties of carbon are essentially the same, differing only in state of aggregation and in containing some accidental impurities,—tended to overthrow the opinion, long received as an indisputable axiom, "that bodies cannot be exactly the same in composition or chemical nature, and yet totally different in their physical properties."

At Rome he began his beautiful book entitled "Consolations in Travel." Every page affords abundant proof of the profound interest with which he regarded the marvellous works of art and nature it had been his good fortune to examine. It was completed in his later life, when illness had made fatal inroads on his frame, but when his perceptions of the beautiful were not less vivid. We may borrow from its pages his description of Ancient Rome, as an illustration of the manner in which his intellect took up and enjoyed the various interesting subjects that came before it. Speaking of the Coliseum, he says:—

How impressive are these ruins!—what a character do they give us of the ancient Romans, what magnificence of design, what grandeur of execution! Had we not historical documents to inform us of the period when this structure was raised, and of the purposes for which it was designed, it might be imagined the work of a race of giants, a council-chamber for those Titans fabled to have warred against the gods of the pagan mythology. The size of the masses of travertine of which it is composed is in harmony with the immense magnitude of the building. It is hardly to be wondered at that a people who constructed such a work for their daily sports, for their usual amusements, should have possessed strength, enduring energy, and perseverance sufficient to enable them to conquer the world. They appear always to have formed their plans and made their combinations as if their power were beyond the reach of chance, in-

dependent of the influence of time, and founded for unlimited duration—for eternity !

So picturesque is the aspect of this mass of ruins, that it is impossible, Sir Humphrey continues, to regret its decay ; and at this season of the year (autumn) the colours of the vegetation are in harmony with those of the falling pile ; and how perfectly the whole landscape is in tone ! The remains of the palace of the Cæsars, and of the Golden Hall * of Nero, appear in the distance, their gray and tottering turrets and their moss-stained arches reposing, as it were, upon the decaying vegetation ; and there is nothing that marks the existence of life except the few pious devotees, who wander from station to station in the arena below, kneeling before the cross,† and demonstrating the triumph of a religion which received in this very spot, in the early period of its existence, one of its most severe persecutions, and which, nevertheless, has preserved what remains of that building where attempts were made to stifle it almost at its birth ; for, without the influence of Christianity, these majestic ruins would have been dispersed or levelled to the dust.

Plundered of their lead and iron by the barbarians, Goths and Vandals, and robbed even of their stones by Roman princes, the Barberini, they owe what remains of their relics to the sanctifying influence of that faith which has preserved for the world all that was worth preserving ;—not merely arts and literature, but likewise that which constitutes the progressive nature of intellect, and the institutions which afford to us happiness in this world and hopes of a blessed immortality in the next. And, being of the Christian faith, I may say that the preservation of this pile, by the sanctifying effect of a few crosses planted round it, is almost a miraculous event. And what a contrast the pre-

* The reference is to the Aurea Domus, erected by Nero.

† A wooden cross stands in the centre of the vast arena of the Coliseum.

sent application of this building, connected with holy fears and exalted hopes, is to that of the ancient one, when it was used for exhibiting to the Roman people the destruction of men by wild beasts,—or of men, more savage than wild beasts, by each other,—to gratify a horrible appetite for cruelty, founded upon a still more detestable lust, that of universal domination ! And who would have supposed, in the time of Titus, that a faith, despised in its insignificant origin, and persecuted, from the supposed obscurity of its founder and principles, should have reared a dome to the memory of one of its humblest teachers, more glorious than was ever framed for Jupiter or Apollo in the ancient world ; and have preserved even the ruins of the temples of the pagan deities ; and have burst forth in splendour and majesty, consecrating truth amidst the shrines of error ; employing the idols of the Roman superstition for the most holy purposes, and rising a bright and constant light amidst the dark and starless night which followed the destruction of the Roman Empire !

At Milan, Davy made the acquaintance of the distinguished Voltá, to whom Science is indebted for one of the most powerful and important of her agencies,—the galvanic battery. He also met with Piazzzi, the astronomer, who discovered the planetoid which bears his name ; and Morichini, another illustrious savant. In his “Sketches of Distinguished Men” he thus speaks of the three :—

Voltá was at that time advanced in years,—I think nearly seventy,—and in bad health. His conversation was not brilliant ; his views rather limited, but marking great in-

genuity. His manners were perfectly simple. He had not the air of a courtier, or even of a man who had seen the world. Indeed, I can say generally of the Italian savants, that, though none of them had much dignity or grace of manner, yet they were all free from affectation.

In Piazzi, likewise an old man, there was more of exterior philosophical character than in Voltá; and he discussed subjects with more brilliancy of address, and with a little of the tone of a master.

There never was a man of more amiable or benevolent character than Morichini; and his principal discovery shows an acuteness and originality not usual now in his countrymen.

From Milan he crossed the Alps by the Simplon, and reached Geneva, where, surrounded by scenes of the most enchanting romance, and associations of the highest poetry, he remained until September. In returning to winter in Italy, he traversed the wild but magnificent region of the Tyrol.

In his note-book he describes the features of a Tyrolese landscape :—

Deep glens; and in two of them two blue rivers, rolling and foaming over rocks of syenite and micaceous schist. The depth of the glens is much greater, it would appear, than in Switzerland; they are narrow, with pine and birch below; then cultivated patches, and above them pine and birch and larch again; and above all, lofty mountains, dark and frowning, but with glittering masses of snow lying on their bosoms, and crowning their summits. The sky harmonized with the grandeur and solemnity of the scene; it

was clouded, but something like a soft October day in England. The clouds, of the purest white, played amongst the mountains, and gave to their dark firs and nodding rocks a deeper gloom by contrast. Now and then the sun burst forth, and made the yellow birch lighten into tints of gold.

Here is another pleasant picture :—

The features of the scenery are exquisitely beautiful ; the valleys clothed with vines sporting round mulberry-trees, elms, and fruit-trees, and hung with clusters of purple grapes. The mountains all of limestone ; and blue, gray, reddish, or white. In the midst of a highly cultivated valley, watered by the Adige—here a sober, pastoral, clear river, as large as or larger than the Tay, containing trout, barbel, and eels, and probably a few grayling—is situated the town of Trente. From Trente to Bassano the road is full of charm, of the beautiful passing into the sublime. As we come to the division of the waters, those which feed the Adige, and those that feed the Brenta, we notice the appearance of a rude kind of porphyry, and of micaceous schist ; the hills crowned with snow, rising above the Brenta, are probably of the latter rock. On descending towards the plain, the traveller passes a variety of clothed hills, rich in the variegated vegetation of birch, oak, wild grape, clematis ; a small lake, and then a larger one, beautifully wooded, sending a small clear stream to form the Brenta.

He returned to Rome by the ancient and historic cities of Ferrara and Bologna, and crossed the “piny Apennines” to Florence. At Pietra Mala, in the heart of the mountains, and at an elevation of several thousand feet above the sea-level, a singular column of flame, of considerable

magnitude, is almost perpetually burning; and in more than one place in its vicinity the springs are agitated by the disengagement of air which kindles on the approach of a light, and burns with a flame like that of the great column. As Sir Humphrey Davy passed through Pietra Mala he collected some of this air, and at Florence submitted it to analysis, when he ascertained that it was carburetted hydrogen, or coal-gas; and hence he inferred that its origin was the same—that it was produced from a bed of coal, acted upon by subterraneous heat.

He spent the winter at Rome, occupied in chemical experiments of much value, whose results, as communicated to the Royal Society, were published in the “Philosophical Transactions” for 1815.

In March 1815 he removed to Naples, and on the 16th of the month he accomplished the ascent of Vesuvius.

Soon afterwards his thoughts turned towards England, and after a rapid transit across the Tyrol, part of Germany, and Flanders, he arrived in London on the 23rd of April.

While journeying through the Tyrol, the old Tyrolese hero, Speckbacher, who had led the

resistance against the Austrians, was lying very ill; and hearing that a great philosopher had arrived in his neighbourhood, he concluded he must be a doctor, and sent to beg some advice about his complaint. Sir Humphrey did not profess to know much of medicine, but he prescribed some remedies which, fortunately, did the old patriot good; and then Speckbacker felt very unhappy because the philosopher refused to receive any fee. So Sir Humphrey said: "Well, that you may not regret my accepting no recompense for my advice, I will take any old pistol, or rusty bit of a sword, that was used in your Tyrolese war of defence, for I have a friend who would be delighted to possess any such memorial; and you may be sure it would be hung up in his hall, and its story told, for many a year to come." Speckbacker clapped his hands together, much delighted with the request, and exclaimed: "Oh, I have the very thing! You shall have the gun that I used myself when I shot thirty Bavarians in one day." The illustrious gun was given accordingly to Sir Humphrey, who took it with him soon afterwards to Scotland, and presented it to Sir Walter Scott at Abbotsford.

It was in 1815, as we have already narrated,

that Sir Humphrey invented the safety-lamp, which has saved so many valuable lives. His friends pressed him to take out a patent for his invention, on the ground that by so doing he would gain a large yearly profit; but Sir Humphrey refused. His sole object, he said, was to serve the cause of humanity; to do something to lessen the vast aggregate of human sorrow and suffering; and having succeeded, he required no pecuniary reward. "I have enough," he added, "for all my views and purposes: more wealth might be troublesome, and distract my attention from those pursuits in which I delight. More wealth could not increase either my fame or my happiness. It might, undoubtedly, enable me to put four horses to my carriage; but what would it avail me to have it said that Sir Humphrey drives his carriage and four?"

Such reasoning, no doubt, is just and accurate; but, unfortunately, it commends itself to only a limited number of minds. And we must not refuse our admiration, therefore, when we meet with so brilliant an example of magnanimous moderation.

Many fine indications of Davy's purity and loftiness of mind are afforded by the thoughts and

reflections which he committed to his note-books. From those written during this period of his life we make a few extracts, because we are anxious the reader should appreciate the genuine excellence of our philosopher's character.

"Persons of very exalted talents and virtues may be said to derive their patent of nobility directly from God ; and their titles are not registered in perishable court calendars, but written in the great histories of nature or of man."

"It is better to deserve honours and not to have them, than to have them and not deserve them."

"Pride makes men entertaining only to themselves ; vanity makes them entertaining to others."

"The best faculties of man are employed for futurity ; speaking is better than acting, writing is better than speaking. The politician is a creature of to-day ; the philosopher a child of to-morrow : the one is like the upper surface of the water, changed by the wind, the cloud, and the sunshine ; the other is like its depths, always tranquil and unchanged."

"The aspirations for immortality are movements of the mind similar to those which the bird makes with its wings before they are furnished with feathers."

"Human life may be compared to mountain scenery in a cloudy and windy day, when the clouds cover more sky than is open. We wonder at the bright light, travelling rapidly along the surface of the mountain, and while we wonder it is gone. Now the distances appear in light, and now in shade ; and parts of the horizon of futurity are bright in sunshine, and others dark in gloom. The hopes that we have with respect to another state of existence may be compared to the reflections that we see in the sky, when we ourselves are in gloom, from a distant sunny country. We

are conscious that there is a lighted surface in sunshine, though we are totally ignorant of the source of it."

"What appears most desirable to the child, the gilded toy, is despicable to the man ; and how little the child cares for the objects of the ambition of the man !"

And now we submit to the reader, in further illustration of the "inner self" of this devout-minded, thoughtful, and clear-souled man, another of his essays in verse. It appears to have been written in 1816 :—

The massy pillars of the Earth,
The inert rocks, the solid stones,
Which give no power, no motion brisk,
Which are to Nature lifeless bones,

Change slowly ; but their dust remains,
And every atom, measured, weighed,
Is whirled by blasts along the plains,
Or in the fertile furrow laid.

The drops that from the transient shower
Fall in the noonday bright and clear,
Or kindle beauty in the flower,
Or waken freshness in the air.

Nothing is lost ; the ethereal fire
Which from the farthest star descends,
Through the immensity of space
Its course, by worlds attracted, bends.

To reach the Earth, the Eternal Laws
Preserve one glorious, wise design ;
Order amidst confusion flows,
And all the system is divine.

If *matter* cannot be destroyed,
The *living mind* can never die ;

If e'en creative when alloyed,
How sure its immortality !

Then think that intellectual light
Thou lov'dst on earth is burning still,
Its lustre purer and more bright,
Obscured no more by mortal will.

All things most glorious on the earth,
Though transient and short-lived they seem,
Have yet a source of heavenly birth
Immortal,—not a fleeting dream.

The lovely, changeful light of even,
The fading gleams of morning skies,
The evanescent tints of Heaven,
From the eternal sun arise.

In 1818 Sir Humphrey undertook another Continental tour. He left England on the 26th of May ; crossed Austrian Flanders, as it was then called, into Germany ; descended the Danube from Ratisbon ; and reached Vienna about the 13th of June.

After a brief stay in the beautiful Austrian capital, our philosopher traversed various districts of Hungary, and made excursions into the romantic scenery of Styria, Carinthia, and Carniola, where ever new combinations of mountain, lake, river, and forest, surprise and delight the lover of Nature.

Then he passed into Italy ; visited Venice, the discrowned Queen of the Adriatic, sitting silent

and mournful among her seventy isles ; crossed the Apennines ; sojourned a while in the Eternal City ; and betook himself southward to the romantic shores of that lovely Parthenopean Bay which has equally won the admiration of ancient and modern travellers.

The year 1819 was in like manner occupied with Continental excursions, of which he has left some interesting particulars in his journals. On the approach of winter he returned to Rome, from whence he again visited Naples. Here he occupied himself with inquiries into the phenomena of volcanoes, which he could nowhere study on a grander scale than in the neighbourhood of Vesuvius. His impressions of this famous mountain we find recorded in one of his unfinished dialogues. The speakers are supposed to have reached the summit of Vesuvius, and on that lofty watch-tower to await the first flush of sunrise :—

Arch. It is now almost the time when we should perceive the dawning of the eastern light ; but from these heavy clouds which obscure the whole of our horizon, and from the long-continued and dead stillness of the mountain, I suspect that we are on the eve of some great change, and a storm, if not an eruption, is approaching ; so I think it will be prudent for us to return to Naples.—(The party return to Naples.)

P. It would have been too much to have expected in twenty-four hours, and after so splendid a sunset as we

witnessed last evening, the reappearance of that glorious luminary under the same brilliant and beautiful circumstances. But the storm which you augured does not yet fall. There is a peculiar heat in the air ; and the sea, though there is no breath of wind, seems to roll waves almost as black as pitch, from the reflection of the sky towards the shore.

A. Surely I felt at that moment a motion of the ground beneath me. And hark ! the bells of the churches tinkle ; it must have been the first shock of an earthquake !

All. We felt it.

A. Watch the mountain ! See ! the pitchy cloud on the top of it bursts open, and a column of flame, and a jet of lava, and red-hot stones rise into the middle heaven. The ground again shakes, and, lo, the tremendous thunder of an eruption !

P. Lo, the lava* bursts from the top ! And watch the skies filled with flames ;† a river of fire descends into the earth ! I give you joy, Archæus, that the wish you have so long indulged is gratified, and that you will have an opportunity of examining and studying the results of a volcanic eruption. But the lightning now flashes from the thick clouds into the flame of the volcano, and the thunders of the heavens respond, as it were, to the noise of the subterranean artillery ; the rain falls in torrents, and a thick cloud, which, from its extreme darkness and opacity, must contain stones or dust, is approaching towards Naples ! We must wait for another day to make our visit to the mountain ; it would now be a service of danger to attempt to approach it.

The scene is changed ; and the two characters

* The minerals melted and liquefied by intense heat form a pitchy substance called *lava*, which hardens as it cools.

† The word "flame" must not be understood literally. Volcanoes in eruption do not give forth any actual flame, the fiery appearance of the sky being due to the reflection of the burning ashes and red-hot stones.

are supposed to have reached the base of the volcano.

A. The violence of the explosion is now over. Though the clouds still cover the top of the mountain, yet I think we can ascend to the spot whence the lava issues as from a fountain. And what a magnificent sight is this river of fire, nearly half a mile in length, and in some places fifty yards broad.*

P. It would be still more magnificent in the night, when its high temperature would be more apparent, and when the dense white smoke rising from it would appear like flame from the reflected light. The appearance of the lava does not correspond to what I had expected to see. It appears liquid only at its exit from the mountain; and, though continually moving on, it soon loses its character of a river of fire, and appears only a shapeless heap of enormous slags, covered with ashes, and destroying everything it meets in its course.

A. The fused lava soon cools, from the effects of the atmosphere at the surface, and forms those large masses of scoria; the liquid still moves on below, being pressed forward by the new portions thrown from the fountain. But in a dark night all these masses would appear more or less luminous.

Sir Humphrey returned to England early in June 1820. On the 19th of the same month died Sir Joseph Banks, President of the Royal Society, and Sir Humphrey immediately became a candidate for the highest dignity to which a man of science can aspire in England,—an office

* The streams of lava are sometimes four to five miles in length, and three hundred feet in width.

once filled by Newton, and never yet unworthily occupied. Other candidates were spoken of, but it was felt that their claims could not bear comparison with those of the greatest English chemist, and on the 30th of November he was unanimously, or almost unanimously, elected. For seven years afterwards he was successively re-elected without any attempt at opposition.

As president, he was in the habit of giving, during the season, a series of Saturday evening réunions, which were very numerous attended, and were not less agreeable and entertaining than useful and beneficial. They brought together not merely men of science, but also *littérateurs*, artists, poets, English country gentlemen, politicians, and foreign visitors of distinction. The current topics of interest were freely and fully discussed; curious information was circulated from authentic sources; and knowledge exchanged between individuals, as in a great mart of traffic, each giving and receiving according to his acquirements and wants. There the naturalist or physiologist could consult the African traveller or Arctic explorer respecting the particular subjects of his studies, and suggest points for future investigation, or solve difficulties which had perplexed the

original observers. Scarcely an evening passed by but some novelty or curiosity in art, science, or nature was brought forward and examined—such as the fossils discovered in the bone-cave at Kirkdale, a new chemical compound, a valuable experiment in magnetism, a recent mineral, or some novel instrument or apparatus; and to each an additional interest was communicated by the presence of the inventor or discoverer, who was ready to offer what explanations might be needed.

In these parties, says one of Sir Humphrey's biographers, the distinctions of society seemed very much to be lost in the distinctions conferred by science and merit. Men of the highest rank in the country mingled with men whose only claim to notice was that illustrious and unquestionable claim, superiority of knowledge and intellectual power; and it was a noble thing to see how much more attractive it was, how much more honoured, than the greatest social rank when destitute of this title to respect and admiration. "I remember, one evening," says our authority, "when the company was reduced to a small number by the lateness of the hour, and those who remained had collected round the fire, one of the party—I believe it was Dr. Young—remarked,

‘Ah, I perceive all here are doctors!’ And so it proved: there being two or three doctors of physic, one, I believe, of divinity, and three of civil law; and of these last, two were baronets, and one was an earl, who, though distinguished for his high bearing on ordinary occasions, on *this* occasion seemed pleased to be considered of the same grade as the rest.”

In the spring of 1822, Sir Humphrey made a fishing excursion in Ireland; for he retained throughout life that fondness for Izaak Walton’s “gentle art” which he had cherished in his early years. The autumn was devoted to scientific pursuits, and in the winter he visited his family at Penzance. His townsmen seized the opportunity of his presence amongst them to prove their gratitude for the distinction his fame had conferred upon their ancient burgh, by inviting him to a public dinner.

Such incidents, we are aware, possess but little interest, and the career of a man like Davy is wholly wanting in the incidents of romance. But our object is to show how happy and useful a life of peaceful endeavour may be made, and what advantages it may confer on society and the world at large. We cannot all live lives of excitement,

of daring deeds and splendid enterprises ; but we can all do our duty faithfully and unassumingly, and in so doing we shall each contribute, in a greater or less degree, according to our opportunities, to swell the sum of human happiness. The life of a Sir Humphrey Davy, when contrasted with that of a Napoleon Bonaparte, must necessarily seem colourless, feeble, uninteresting ; but which was the more beneficial ? Which was the *Christian* life ? Which would be the more consoling to look back upon at that supreme hour when we are considering the account we must give of our actions to the Supreme Judge ? The applause of the world is too often gained by neglect of duty, by a violation of the principles on which human and divine law are equally founded. Let us seek no such dangerous renown ; let us be content with that purer if more modest distinction which usually awaits the man of high motives, Christian life, and spotless character !

In the summer of 1822, Davy visited Scotland, and roamed delighted among the wildest scenery of the Ross-shire Highlands. It was on this occasion he witnessed the interesting incident of two eagles, male and female, teaching their young brood to fly. He has described it very graphi-

cally in his "Salmonia," but our readers will be better pleased, perhaps, with his versified record of the circumstances, as agreeably diversifying the prosaic tenor of our simple and unadorned narrative :—

THE EAGLES

The mighty birds still upward rose,
In slow, but constant, and most steady flight,
The young ones following ; and they would pause,
As if to teach them how to bear the light,
And keep the solar glory full in sight.
So went they on, till, from excess of pain,
I could no longer bear the scorching rays ;
And when I looked again they were not seen,
Lost in the brightness of the solar blaze.
Their memory left a type, and a desire :
So should I wish towards the light to rise,
Instructing younger spirits to aspire
Where I could never reach amidst the skies,
And joy below to see them lifted higher,
Seeking the light of purest glory's prize.
So would I look on splendour's brightest day
With an undazzled eye, and steadily
Soar upwards full in the immortal ray,
Through the blue depths of the unclouded sky.
Portraying wisdom's boundless purity.
Before me still a lingering ray appears,
But broken and prismatic, seen through tears,
The light of joy and immortality.

We may note here that, towards the close of 1823, the first symptoms became apparent of the malady which was destined to terminate his valuable life at a comparatively early age.

The next two years were spent in quiet study

and laborious experiment, chiefly with a view of discovering some means of preventing the corrosion of the copper sheathing of ships by the action of sea-water. The remedy he devised was by rendering it negatively electrical. "My results," he writes, "are of the most beautiful and unequivocal kind; a mass of tin renders a surface of copper two or three hundred times its own size sufficiently electrical to have no action on sea-water."

In the summer of 1824 he made a voyage to the North Sea, in the course of which he visited Heligoland; that curious little rocky islet, which seems menaced with destruction by the encroaching waters. In Norway he had some experience of salmon-fishing under difficulties, as the following extract from his journal will show:—

The scene was in the vicinity of the Norwegian town of Mandels, which is situated on a river of about the same size as the Tweed before it is joined by the Teviot. This river has the reputation (or had) of affording the best salmon in Norway. Sir Humphrey and his friends procured a boat, embarked, and began to ascend the stream, which flows through a succession of enchanting sylvan landscapes. The woods stretch down to the very edge of the water; and the banks are green, grassy slopes, enriched with wild flowers, and clothed with drooping trees. The fishermen continued their progress until stopped by a rapid, where the rocks came down close to the river, and the scenery was wilder

and on a grander scale. Here they left the boat, and walked about a mile to the Mandels Fall, which is rather a rapid than a fall; a succession of foaming stream and pool, where the water leaps from rock to rock, in bounds varying from four to ten feet in depth. Over these natural weirs the salmon easily make their way. The narrow channel through which the river runs is very picturesque, and the birch-trees grow close to the shining falls, as if out of the solid granite rock. Though the sun was bright, Sir Humphrey thought himself sure of a salmon; but all his skill was in vain. The fish were not to be beguiled even by a philosopher.

Next day, Lord Clinton and he repaired to a salt-water lake or pond, and were rewarded for their pains with four large sea-trout. Here the scenery was exquisitely beautiful: a succession of arms of the sea, all like inland lakes, full of granite islands, and embosomed among high hills bright with luxuriant vegetation; with rose and woodbine, and our sweet English flowers, and the graceful rowan, and the lady birch, and the stalwart oak, all in indescribable profusion. Every moment the boat, as it swept onward, passed into some new phase of beauty in this magical land of beauty.

Davy and his companion inquired of the natives if there was no fresh-water stream at hand in which, as anglers, they might try their skill. They were conducted to a spot evidently swept by a torrent in the rainy season, and in less than twenty yards found themselves on the rocky brink of an inland fresh-water lake, as beautiful as the upper Lake of Killarney, and something like it. Here they fished, and again were unsuccessful; but the exquisite loveliness of the scenery consoled them for their want of fortune. In addition to the usual forms of forest vegetation, heath and juniper and the blaeberry abounded; and placidly on the still bosom of the lake spread the broad green leaves of innumerable water-lilies.

Sir Humphrey was told of a fall on a river about six miles

to the west. Straightway he mounted a Norwegian pony, and, accompanied by the son of the innkeeper, rode forth to discover it. The way led through sweet and striking landscapes. At first, two fine fresh-water lakes came in view, studded with leafy islands ; the granite rocks rose to such a height as almost to assume the character of mountains, and their summits were crowned with noble woods. For five miles the valleys were very narrow, but the scenery everywhere was rich in forest growth. They passed a mountain torrent, beautifully banked and wooded. Then, after reaching the top of the second mountain-ridge, they saw a deep pastoral valley lying below, with a crystal lake embosomed in it, like a pearl in a circle of emerald ; and after mounting another ascent, which was tolerably well under cultivation, they came to the river, which rolled, exultant and glorious, through a broad vale, bordered by stern cliffs of granite, with piny hills stretching far, far away in the azure distance. Sir Humphrey Davy was fully repaid, as a lover and student of Nature, for his exertions ; but his rod brought him neither honour nor reward in the shape of “finny spoil.”

Passing into Sweden, our philosopher visited Wenersburgh, below which he made an excursion to the romantic river Gotha :—

It pours, he writes, with great fury beneath a bridge thrown from rock to rock, over which we passed, and makes a fine rapid, or almost a fall ; there is another rapid or fall of the same kind just below. The banks are well wooded. A kind of extended ridge of rock, capped by pines, stretches to the left, and may have been an ancient bank of the river. From its distant appearance I should conjecture it to be trap ; but granite is the prevailing rock of the country. I passed by some small lakes, over some wild heaths, and at last came upon the white foam of the cataract of Trothetta,

rising like smoke amidst the village. The river above is a fine, wild, and tranquil expanse : at first it is tortured in its fall by saw-mills, but at the second fall they disappear. Here there is nothing but the grand forms of nature : the bold, grand cliffs two hundred or three hundred feet high, covered with an almost infinite variety of kinds of wood, and capped by gigantic pines. The water is beautifully clear, and the rapids and falls for nearly half a mile present a variety of picturesque effects. Here a deep whirlpool beneath a fall of twenty or thirty feet in height, and where the river is pressed into the narrowest possible channel ; there a succession of rapids, and all white foam, and force, and thunder.

In 1825 he visited the north of England, after the conclusion of the session of the Royal Society ; and during the Christmas holidays passed a short time in South Wales. The following lines were composed amidst the wild and beautiful scenery of Westmoreland :—

ULLSWATER, *August 4, 1825.*

Ye lovely hills, that rise in majesty
 Amidst the ruddy light of setting suns,
 Your tops are bright with radiance, whilst below
 The wave is dark and gloomy, and the vale
 Hid in obscurest mist. Such is the life
 Of man : this vale of earth and waters, dark
 And gloomy ; but the mountain range above,
 The skies, the heavens, are bright. There is a ray
 Of evening which does not end in night,—
 A sun of which we catch uncertain gleams
 In this our mortal state, but which for ever
 Shines from afar, wakening the spirit of man
 To life immortal and undying glory !

A similar vein of reflection, and one to which

our philosopher seems to have been particularly partial, may be traced in the following stanzas :—

And when the light of life is flying,
And darkness round us seems to close,
Nought do we truly know of dying,
Save sinking in a deep repose.

And as in sweetest, soundest slumber
The mind enjoys its happiest dreams,
And in the stillest night we number
Thousands of worlds in starlight beams ;

So may we hope the undying spirit,
In quitting its decaying form,
Breaks forth new glory to inherit,
As lightning from the gloomy storm.

We may here pause to inquire, What are the lessons which the young reader should gather from the record of this pure, successful, and most useful life? He will see, in the first place, that opportunities always come to the men of perseverance and application who know how to make use of them when they *do* come. It is, perhaps, a truth, that to each one of us an occasion is presented, at one time or another, of gaining a step upward; and that the difference between men lies in their capacity to see, or not to see, this opportune moment, and turn it to advantage. Industry and resolution are the wings of fortune. The goddess never favours the idle, the unwilling, or

the purposeless. Success in life is possible only to him who keeps ever before his eyes one certain goal, and in pressing towards it suffers no obstacle to turn him from the direct but laborious path. Robert Nicoll, a Scotch poet, said, very happily, of Samuel Taylor Coleridge: "What a mighty intellect was lost in that man for want of a little energy, a little determination!" And Scripture has recorded the emphatic warning: "Unstable as water, thou shalt not excel." Alas! many a promising life has been wasted in the vain attempt to spread their gold over too wide a surface, to apply their powers to too large a number of objects. The waters which, allowed to run riot over a considerable area, form only a stagnant, shallow, and pestilential morass,—by being directed into a single channel, gain volume, force, and usefulness, and may be made to supply the wants of human industry.

It will be observed that Davy, notwithstanding his many acquirements, devoted himself in the main to the pursuit of chemistry, and it was this steadfastness of aim which secured him prosperity and renown. A striking illustration of the evil of attempting too much, and of the failure that always attends a purposeless and uncertain

life, is afforded by the story of Lawrence Earnshaw.

According to Mr. Smiles, Lawrence Earnshaw, of Mottram, was a very poor man's son, and had served a seven years' apprenticeship to the trade of a tailor, after which he bound himself apprentice to a clothier for seven years; but these trades not suiting his tastes, and his bent of mind inclining towards the mechanical sciences, he finally bound himself apprentice to a clockmaker, whom he also served for seven years. This eccentric individual invented many curious and ingenious machines, which were regarded as of great merit in his time. One of them was an astronomical and geographical machine, beautifully executed, showing the earth's annual and diurnal motion, after the manner of an orrery. He was also, we are told, a musical instrument maker and music teacher, a worker in metals and in wood, a painter and glazier, an optician, a bell-founder, a chemist and metallurgist, an engraver,—in short, an almost universal mechanical genius. *But this was his ruin.* He did, or attempted to do, too much; so much, that he never stood still and established himself in any one thing; and, notwithstanding his brilliant mental gifts,

he died "not worth a groat," at sixty years of age.

But while we exhort our readers to imitate the example of Sir Humphrey Davy, and, in truth, of all men who have attained excellence and acquired renown, whether they be chemists, engineers, inventors, artists, statesmen, or warriors,—while we urge them to devote their powers chiefly to one fixed pursuit, as the only means of satisfying themselves and rendering their lives profitable and useful, it is needful we should guard against a serious misconception. All knowledge is good, and the intellect would be narrow which confined itself to one subject only. Sir Humphrey Davy was a chemist, a poet, an expert angler, a geologist, a close student of Nature, a good linguist ; but he was a chemist *first* and *before all*. And so we do not advise the study of a special theme to the *exclusion* of all others, but *in preference* to all others ; in order that, while you gather what information you can from every side, you may still press steadily towards the goal of your arduous pilgrimage. The river keeps its course seaward with swift and irresistible current, but does not forget to take up the streams which flow through the lateral valleys, or the torrents which

descend the sides of the mountains whose feet it washes. James Watt, the inventor of the steam-engine, was an accomplished botanist. Mr. Gladstone, a successful financier, legislator, and statesman, is one of the finest Greek scholars of his age. The late Lord Chancellor Campbell was a sound lawyer, but not the less an able man of letters. Henry Bickersteth, Master of the Rolls, who rose to be Baron Langdale, was no indifferent physician. The late Sir James Simpson, whose medical fame spread all over the civilized world, was an eager archæologist. James Nasmyth, to whom the mechanician is indebted for that wonderful agent, the steam-hammer, was an admirable artist. We might fill a volume with similar examples, but we have said enough to prove our thesis, that superiority in *one* pursuit does not imply ignorance or neglect of every other. Only, the young student's maxims must be :—

Never attempt too much.

One thing at a time.

Whatever is worth doing at all, is worth doing well.

The old adage, *Divide et impera*—Divide and govern—is as true in the region of study as in the world of politics. Choose your object, and devote all your powers to attain it. The point once

determined at which you mean to aim, turn aside neither to the right nor the left, but press onward and onward, through doubt, discouragement, difficulty,—

“Strong in will,
To strive, to seek, to find, and not to yield.”





CHAPTER IV.

THE CLOSE OF A USEFUL LIFE.

IN December 1826, Sir Humphrey, who had been suffering for some time from many severe and painful symptoms, was seized with an attack of paralysis, which affected the right side, but left unimpaired the mental faculties. After a course of medical treatment, it seemed entirely to disappear, and by the 22nd of January he was so far recovered as to be able to undertake a journey to the Continent. Accompanied by his brother, he rapidly traversed France, and, proceeding through Savoy, crossed Mont Cenis, and descended into Italy. Owing to the rigour of the winter weather, the journey was laborious and difficult. The snow through the whole of Lombardy was even deeper than the travellers had found it in the passes of the Alps; in many places the depth of the drifts exceeded

three and four feet. The landscape wore an arctic character; not only on account of the dreary wilderness of frozen snow which spread all around, and the leaflessness of the trees, and the silence of the ice-bound streams, but from the fact that the inhabitants had removed the wheels from their carts and waggons, and mounted them on sledges, reminding one of the vehicles of the Eskimos.

They reached Ravenna in the first week of March, and soon began to feel the revivifying influences of spring. From this ancient city he addressed a letter to an old friend, which gives some interesting particulars of his mode of life and his mental condition :—

“I am, thank God, better, but still very weak, and wholly unfit for any kind of business and study. I have, however, considerably recovered the use of all the limbs that were affected; and as my amendment has been slow and gradual, I hope in time it may be complete. But I am leading the life of an anchorite, obliged to abstain from flesh, wine, business, study, experiments, and all things that I love; but this discipline is salutary, and, for the sake of being able to do something more for science, and, I hope, for humanity, I submit to it, believing that the great Source of intellectual being so wills it for good.

“I am here lodged in the Apostolical Palace, by the kindness of the Vice-Legate of Ravenna, a most amiable and

enlightened prelate, who has done everything for me that he could have done for a brother.

“I have chosen this spot of the declining empire of Rome as one of solitude and repose, as out of the way of travellers, and in a good climate ; and its monuments and recollections are not without interest. Here Dante composed his divine works ; here Byron wrote some of his best and most moral (if such a name can be applied) poems ; and here the Roman power, that began among the mountains with Romulus, and migrated to the sea, bounding Asia and Europe under Constantine, made its last stand in the marshes formed by the Eridanus (now the Po), under Theodoric, whose tomb is amongst the wonders of the place.

“After a month’s travel in the most severe weather I ever experienced, I arrived here on the 20th of February. The weather has since been fine. My brother and friend, who is likewise my physician, accompanied me, but he is so satisfied with my improvement as to be able to leave me for Corfu ; but he is within a week’s call.

“I have no society here except that of the amiable Vice-Legate, who is the governor of the province ; but this is enough for me, for as yet I can bear but little conversation. I ride in the pine-forest, which is the most magnificent in Europe, and which I wish you could see. You know the trees of Claude Lorraine’s landscapes : imagine a circle of twenty miles of these great fan-shaped pines, green sunny lawns, and little knolls of underwood, with large junipers of the Adriatic in front, and the Apennines still covered with snow behind. The pine-wood partly covers the spot where the Roman fleet once rode. Such is the change of time ! It is my intention to stay here until the beginning of April, and then go to the Alps ; for I must avoid the extremes of heat and cold.”

That his mental energies remained as fresh and

vigorous as ever, and that his intellect delighted in its old subjects of speculation, is clear from the numerous reflections which he at this time committed to his note-books. We subjoin a few extracts :—

“The grand object both of education and of government should be to make men *good* and happy. They may be so without being wise and powerful. They may be wise and powerful, and not good and happy,—and they may be *all*, wise, powerful, good, and happy.”

“Pleasure is creative ; pain, destructive.”

“The false light of love, like the glare of the stormy sunset, gives its own brilliant colour to every object on which it falls, and lights up even the stagnant pool and muddy lake with tints of beauty.”

“Our *real knowledge* is but to be sure that we know nothing ; and I can but doubt if this be a curse or blessing. Those who hope, trust, and believe are surely happier far than those who doubt ; and the submissive child, who of his father's goodness is secure, is far more blessed than the froward one, who sets himself against his powerful will, which, after all his struggles and vain efforts, he must at last obey, rebelling against the love which would have made him happy. Is not this the history of man?—of that bright and beauteous garden, where in innocence and ignorance he lived and loved, till the false taste of knowledge made him wretched, and he *knew that he must die*. And is not this the glory and the consummation of the Christian faith, which gives him back his innocence, his hopes, his confidence in God, which through his life still gilds the future with a golden blessing of an expected immortality. Man fell in Adam : knowledge was his bane ;—man rose in Christ, recover-

ing his ignorance, or substituting *hope* for what was *doubt*."

It is impossible not to regard with satisfaction the deep love of Christian truth, and the simple fervour of Christian faith, which hallowed and illuminated Sir Humphrey Davy's powerful intellect. His philosophy had taught him the misery of doubt and the bliss of trustfulness ; had taught him the littleness of man and the wonderful power of God ; and he consecrated his splendid mental endowments by laying them, in humility and loving awe, at the foot of the Cross. Science and religion are not necessarily hostile ; on the contrary, the more minutely we investigate and the more closely we understand the works of the Creator, the more profoundly shall we worship and admire the love, and the might, and the wisdom they everywhere exhibit.

The amusements and occupations of this blameless and uncorrupted man would seem to have been nearly identical at all periods of his life. He was passionately fond of various branches of natural history ; he loved reading ; and he found a great pleasure in the art of composition. Besides his numerous scientific works, he was the author of two lighter and singularly agreeable volumes—

“Salmonia ; or, Days of Fly-fishing,” and “Consolations in Travel.” These it is impossible to read without feeling that his faculty of observation was as keen as it was accurate ; that his fancy was lively and his judgment well-balanced ; and that he possessed the gift of embodying apt and judicious reflections in appropriate language. He had a quick eye for scenery, and travel was to his observant mind a source of the highest and purest enjoyment. He was partial to most rural sports, and from his boyhood was a lover of the angle, and a piscatorial adept. Seldom has Izaak Walton had a more enthusiastic or skilful disciple.

His brother tells us that at no time of his life did he relinquish this favourite pursuit, except at the commencement of his public career, while he was at Clifton, and the first year or two he was in London, when all his faculties were devoted to scientific labours, under the impulse of a lofty ambition, and an intense desire of distinguishing himself, extending the boundaries of human knowledge, and increasing the sum of human happiness. When he resumed angling, he pursued it passionately for some years, and laid aside his gun. Soon after his marriage, however, he seemed

for awhile to prefer fowling-piece to fishing-rod, probably because he spent most of his autumn holidays in the country. Latterly, according to his brother, it was difficult to say which seemed his preference. By connecting both sports with natural history, he gave them a degree of importance and interest they would not otherwise have possessed, and rendered them additional means of acquiring knowledge. This we see in all his notebooks; for they contain not only the particulars of his day's sport, but also the results of his observations for the purpose of distinguishing species and identifying them, and of ascertaining their routes in migration, and their peculiar diets and habits. He was more of an angler than of a marksman; indeed, few better anglers have ever lived. He "threw the fly" with equal delicacy and dexterity; and his scientific knowledge, no less than his tact, gave him the superiority over the common angler, however practised. Both in salmon-fishing and trout-fishing he won the highest honours. His tackle, it is said, was both curious and elaborate; he seems to have had a pleasure in collecting the gay materials necessary for dressing flies, though he seldom used them himself, except on emergency, having been always too much

occupied to have had leisure for fly-making—an art in which even tolerable skill cannot be obtained without very considerable experience. To this fact every juvenile angler will bear witness.

The following descriptive passage is borrowed from the Life of Sir Humphrey Davy by his brother :—

I am sorry, he says, I have not a portrait of him in his best days in his angler's attire. It was not unoriginal, and considerably picturesque: a white low-crowned hat with a broad brim, its under surface green, as a protection from the sun,—garnished, after a few hours' fishing, with various flies of which trial had been made, as was usually the case; a jacket, either gray or green, single-breasted, furnished with numerous large and small pockets for holding his angling gear; high boots, waterproof, for wading, or more commonly laced shoes; and breeches and gaiters, with caps to the knees made out of an old hat, for the purpose of defence when kneeling by the river-side, when he wished to approach near without being seen by the fish;—such was his attire, with rod in hand, and pannier on back, if not followed by a servant, as he commonly was, carrying the latter, and a landing-net.

His biographer remarks that in fishing, as well as in everything else which he undertook, he displayed extraordinary zeal and energy. He would travel two or three hundred miles to enjoy a day's fishing, and his perseverance was in proportion to his activity. Dr. Davy remembers having fished with him from early dawn to twilight in the river

Ouse in June, for salmon, almost uninterruptedly, yet without securing a solitary fish as a trophy of his prowess. Passionately fond of the beauties of Nature, which he felt as a poet and saw as a philosopher, it may well be believed that the happiest hours of his life were spent by the lake or the river, in the shadowy glen or on the mountain moor. In the open air, in the country, at any season of the year, but more especially in spring and autumn, when in tolerable health, he could always (and sometimes even when labouring under disease) throw off his cares, and rid his mind of all anxious thoughts. Then he recovered the hilarity natural to his disposition, and appeared in his true character ; amiable, and cheerful, and entertaining, the soul of the social circle, and the delight of his friends.

About the middle of April he journeyed northwards, and proceeded to spend the summer among the valleys and highlands of the Eastern Alps. He reached Laybach on the 19th, and remained there until the 23rd of May, when he set out on a tour through Upper Austria, Bavaria, and Illyria. Though he suffered severely from the encroachments of disease, he bravely struggled

against the consequent feelings of depression and despondency, and amused his mind with its customary pursuits. The following lines, descriptive of the Tracon, where it issues in a crystal fall from the lake at Gmünden, was written on the 25th of July 1827. We quote it, not so much on account of its poetic merits, as because it vividly shows the calmness of his intellect, and the favourite direction of his thoughts. The shadow of approaching death, however, was clearly overhanging the poet-philosopher, as he stood by the leaping waters, and, listening to their voice, mused upon the dim, mysterious future. But firmly believing in the truth of Christianity, and accepting with confidence the promises of Christ as recorded in the inspired Word, he looked forward to the supreme hour with serene composure.

ON THE FALL OF THE TRACON.

From the high rock thy lovely waters burst,
As if a new creation from the wand
Of Israel's mighty prophet, sprung to life
To save his people !* But the dreamy thought
Of that most blessed, though but scanty rill,
Gives but faint image of thy might, and power,
And awful force, and fulness, as if a spirit
Imprisoned by magic art, and now released,
Thou thunderest on, determined to destroy ;

* An allusion, of course, to the miracle wrought by Moses, when he smote the rock, and the water welled forth. See Exodus xvii. 6.

And thy mild functions to produce and cheer
Are changed for attributes more terrible,
Saddening, destructive, wildly carrying on
Rocks, trees, before thee, e'en the mighty pine,
Rending the mountain, through a new-torn vale,
Opening thyself a passage to the plain.
But in thy wayward and most perilous leaps
Thou still art pure, and still might image well
The innate mind of poet or of sage.
In thy bright azure depths, and where thy foam
Sinks into quietness, I seem to view
That season of our life when pleasure fades,
And sober reason with its heavenly light
Fills the deep cool of th' unimpassioned,
Escaped from turbulent and fretful youth,
Its troubles, passions, bubbles, noise, and foam,
Which are well imaged in the falling stream.
E'en as I look upon thy mighty flood,
Absorbed in thought, it seems that I become
A part of thee, and in thy thundering waves
My thoughts are lost, and pass to future time,
Seeking the infinite, and rolling on
Towards the sea eternal and unbounded
Of the All-Powerful, Omnipresent Mind !

The following extract from his journal will show that, notwithstanding his failing health, Sir Humphrey retained his love of Nature and his keen faculty of observation.

He writes at Landeck, a small town situated near the confluence of the river Rosana and Inn, and he has just arrived from Bludenz. A finer road, he records, I have never seen, or more romantic scenery. The sources of the Inn, beautifully clear, are visible all the first part of the road, and you soon ascend from the first post-station to the region of the snows, which send down clear blue streams to the Inn.

These streams, we may note, are not only exquisitely

transparent, with a bluish reflection in their waters like the gleam of steel, but are deliciously cool.

I never saw a finer effect, he continues, than that produced by the wind and clouds, when we had passed the summit. It was like a rapid shifting of the most brilliant scenes ; snowy-capped summits shone forth in sunshine, and then were hid by a white cloud. Bright woods and the gushing cataract, all came, as it were, living and moving upon the eye ; the clouds sometimes seemed to fall like stones, and then to rise like balloons. These extraordinary phenomena, it appears,—which are occasionally seen in mountainous districts, as in the Highlands of Scotland,—ended in a thunderstorm and rain ; but even in the rain the scenery was very fine. The stream from the mountains nearly loses its clearness, by foul companions, before it joins the Inn.

On the 23rd of July, our philosopher reached Innsprück, the romantic capital of the Tyrol. Here the valley of the Inn widens considerably, forming almost an amphitheatre, bounded by snow-crested mountains. The general outline of the landscape is calm and bold, majestic and tranquil ; the valley, an emerald green, vividly contrasted by the white foaming waters of the rapid river. The walks in the neighbourhood are very fine, with continually recurring prospects of gigantic mountain-peaks.

On the 1st of August he arrived at Greifenburg, in the picturesque valley of the Drave. Thence he proceeded to Laybach, where he had a very

severe attack of his complaint ; and, afterwards, we trace him successively to Lienz, Brenner, Naureite, and Ulm. On the 22nd of September he was at Baden, whence he returned to England, arriving at Dover on the 6th of October.

He remained in England till the last week of the following March, and, so far as his health was concerned, seemed neither decidedly better nor worse. In this miserably fluctuating state he continued, occasionally indulging in sanguine hopes of ultimate recovery, and willingly adopting new modes of treatment ; occasionally despairing of any real amendment, yet manfully struggling on, and refusing to be conquered by his infirmities.

In the spring he resolved on again quitting England for his favourite Alpine regions in Southern Austria. Among their glens, and woods, and peaks he proposed to pass the summer, and in the winter to descend into the warmer air of Italy.

I was desirous, he writes, in his "Consolations in Travel," of again spending some time in these scenes, in the hope of re-establishing a broken constitution ; and though this hope was a feeble one, yet at least I expected to spend a few of the last days of life more tranquilly and more agreeably than in the metropolis of my own country. He adds, in pathetic and beautiful language: Nature never deceives us. The rocks, the mountains, the streams, always speak the same language

A shower of snow may hide the verdant woods in spring—a thunderstorm may render the blue, limpid streams foul and turbulent; but these effects are rare and transient; in a few hours, or at least days, all the sources of beauty are renovated; and Nature affords no continued trains of misfortunes and miseries, such as depend upon the constitution of humanity,—no hopes for ever blighted in the bud,—no beings full of life, beauty, and promise, taken from us in the prime of youth. Her fruits are all balmy, bright, and sweet; she affords none of those blighted ones so common in the life of man, and so like the fabled apples of the Dead Sea,—fresh and beautiful to the sight, but, when tasted, full of bitterness and ashes.

Sir Humphrey left London on the 29th of March, accompanied by a young medical gentleman named Tobin. Passing through Flanders, he crossed the whole breadth of Germany from the Rhine to the Danube; and from Donauwerth struck southward to Laybach, where he arrived on the 4th of May.

After amusing himself for a few days with his favourite sports, he proceeded to Wurzen, which he describes, in his journals, as sublime in the majesty of Alpine grandeur. The snowy peaks of the Noric Alps rose above a belt of thunder-clouds, while spring was blooming below in all its brightness and beauty; its buds and blossoms adorning the face of nature under a frowning canopy of dark clouds, like some Italian Judith,—a dark

regal brow and flashing eyes, with a mouth of Venus and the Graces.

We find Sir Humphrey at Ischl in June, and his letters from thence show that his disease was making rapid progress, in spite of all the varieties of medical treatment to which he subjected himself. At this time he wrote a considerable part of the additions intended for the second edition of his "Salmonia;" and here he planned his last work, so appropriately named "Consolations in Travel; or, the Last Days of a Philosopher." The opening Dialogue, called "The Vision," was written at Ischl.

On the 6th of October he repaired to Trieste, expressly for the purpose of trying some experiments he had long been meditating, on the electricity of the torpedo. Thence he proceeded to Rome, where he finished the "Consolations in Travel." The winter was spent by Sir Humphrey in his usual pursuits, but no improvement in his health took place. On the 6th of February 1829, he addressed to his old friend, Mr. Poole, the last letter he ever wrote to him :—

"I have not written to you during my absence from England, because I had no satisfactory account of any marked

progress towards health to give you ; and the feelings of an invalid are painful enough for himself, and should, I think, never form a part of his correspondence, for they are not diminished by the conviction that they are felt by others. Would I were better ! I would then write to you an agreeable letter from this glorious city ; but I am here *wearing away* the winter,—a ruin amongst ruins ! I am anxious to hear from you,—very anxious,—so pray write to me with this address : ‘ Sir H. Davy, Inglese, poste restante, Revigo, Italia.’ You know you must pay the postage to the frontier, otherwise the letter, like one a friend sent to me, will go back to you. Pray be so good as to be particular in the direction : the Inglese is necessary. I hope you got a copy of my little trifle, ‘ Salmonia.’ I ordered copies to be sent to you, but as the course of letters in foreign countries is uncertain, I am not sure you received them ; if not, you will have lost little : a *second edition* will soon be out, which will in every respect be more worthy of your perusal, being, I think, twice (not saying much for it) as entertaining and philosophical. I will take care, by early orders, that you have this book. I write and philosophize a good deal, and have nearly finished a work with a higher aim than the little book I speak of above, which I shall dedicate to you. It contains the essence of my philosophical opinions, and some of my poetical reveries. It is, like the ‘ Salmonia,’ an amusement of my sickness ; but ‘ paulo majora canamus.’ I sometimes think of the lines of Waller, and seem to feel their truth,—

‘ The soul’s dark cottage, battered and decayed,
Lets in new light through chinks that Time has made.’

“ I have, notwithstanding my infirmities, attended to scientific objects whenever it was in my power : and I have sent the Royal Society a paper—which they will publish—on the peculiar electricity of the torpedo, which, I think,

bears remotely upon the functions of life. I attend a good deal to natural history: and I think I have recognized in the Mediterranean a new species of eel, a sort of link between the conger and the *muraena* of the ancients. I have no doubt Mr. Baker is right about the distinction between the conger and the common eel.

“I fight against sickness and fate, believing I have still duties to perform, and that even my illness is connected in some way with my being made useful to my fellow-creatures. I have this conviction full on my mind, that intellectual beings spring from the same breath of Infinite Intelligence, and return to it again, but by different courses. Like rivers born amidst the clouds of heaven, and lost in the deep and eternal ocean—some in youth, rapid and short-lived torrents; some in manhood, powerful and copious rivers; and some in age, by a winding and slow course, half lost in their career, and making their exit by many sundry and shallow mouths. I think of taking some baths before I return into Upper Austria; but I write as if I were a strong man, when I am like a pendulum, as it were, swinging between death and life. God bless you, my dear Poole!—Your grateful and affectionate friend,

“H. DAVY.”

From this time until the 20th his state of health continued variable. On the 20th, suddenly, and without premonitory symptoms, came on the terrible attack which eventually proved fatal. After breakfast, he had sat for some time dictating additions to his “Consolations in Travel.” When these were finished he rose to move into his bed-room, but found himself unable to stand. Without any pains in the head,

any vertigo, or any loss of intellectual power, he had been deprived of all control over his limbs. Medical aid was immediately procured, and the usual remedies administered, but without any good effect. He passed a restless night, and in the morning the right side was completely paralyzed.

On the 23rd he dictated to his brother John the following letter, which we quote as a proof of the composure and mental tranquillity of this eminent Christian philosopher :—

“MY DEAR JOHN,—Notwithstanding all my care and discipline, and ascetic living, I am dying from a severe attack of palsy, which has seized the whole of the body, with the exception of the intellectual organ. I am under the usual severe discipline of bleeding and blistering; but the weakness increases, and a few hours or days will finish my mortal existence. I shall leave my bones in the Eternal City. I bless God that I have been able to finish all my philosophical labours. I have composed six dialogues, and yesterday finished the last of them. There is one copy in five small volumes complete, and Mr. Tobin is now making another copy, in case of accident. I hope you will have the goodness to see these works published.

“The second edition of ‘Salmonia’ by this time is, I believe, printed. I have given you, by a codicil to my will, the copyright of these books; and I shall enclose you an order on Murray* for the profits of the first edition of ‘Salmonia.’ God bless you, my dear John! May you

* The eminent London publisher.

be happy and prosperous!—Your affectionate friend and brother,

“H. DAVY.”

This letter was signed by the invalid, who added in his own handwriting, though the characters were scarcely legible, “Come as quickly as possible.”

It is satisfactory to know that sufficient time was allowed for his brother to obey this injunction, and join him in Rome. For awhile, indeed, he seemed to recover, and hopes were entertained that his life might yet be spared for many years. So great was the rebound, that on the 30th of April he was able to quit Rome on the way to Geneva, and he enjoyed with as much zest as ever the beauty of the scenes through which he passed. On the 3rd of May he arrived at Sienna; on the 5th, at Florence, where he recruited considerably. His spirits improved, and he took frequent drives in its lovely and picturesque neighbourhood.

From Florence, still attended by his brother, he proceeded—by way of Lucca, Carrara, Massa, Pescia, and along the coast—to Genoa. There he remained a week, enjoying to the utmost its magnificent prospects of the Mediterranean; its lovely bay; the exquisite and richly varied

scenery of the coast ; and the romantic character of the inland landscapes, where villa, garden, grove, and orchard are mingled in rich profusion, and where the colouring is as rich as the outlines are fanciful and undulatory. By way of Novi and Alessandria, the two brothers proceeded to Turin, and thence to Susa. The summits of the Alps were still covered with snow, but Spring displayed her mature charms in the deep narrow valley through which the road winds its ascent. Here, indeed, it was truly *ver purpureum*, for, owing to the abundance of flowers of that deep glowing hue, the earth seemed clothed in "purple light."

They crossed Mont Cenis on the 23rd, and continuing their Alpine route, arrived at Geneva on the 28th of May. The next day Sir Humphrey Davy had passed to join the "great majority." Without a sigh or a struggle, he expired about 3 A.M. He had borne the journey well ; had conversed cheerfully and brightly ; but the dread summons had gone forth, and before the sun rose on the grand outlines of Mont Blanc and the beautiful shores of the famous lake his spirit had returned to Him who gave it. A life of usefulness, purity, and moral and religious ex-

cellence was fitly closed by a calm and painless death.

He was buried in the cemetery of Geneva on the 1st of June, his funeral being attended by the members of the Academy, the Council of State, the clergy of the city, the English residents and visitors, the members of the Society of Arts, and the Physical Society, and a large gathering of the public. His grave lies close to that of another distinguished man of science—Professor Pictet. A monument to mark the spot was afterwards erected by Lady Davy. It bears the following simple inscription:—

HIC JACET
HUMPHREY DAVY,
 EQVES MAGNÆ BRITANNIÆ BARONETUS,
 OLIM REGIÆ SOCIET: LONDIN: PRÆSES,
 SUMMUS ARCANORUM NATURÆ INDIGATOR.
 NATUS PENZENTLÆ, CORNUBIENSUM, XVII DECEMB: MDCCCLXXVIII.
 OBIIT GENEVÆ HELVETIORUM XXIX MAI, MDCCCXXIX.

The following estimate of the character of Sir Humphrey Davy is gathered from several sources, but more particularly from the careful and discriminative outline drawn by his brother:—

He was a man of sanguine temperament, as most keen intellects are; with a tendency even to

excess of sensibility and irritability, and of vital action, combined with remarkable activity of mind, and a certain warmth and impetuosity of temper. His feelings were quick, and he was prompt of action. In his pursuits he was ardent and indefatigable, full of enthusiasm, stimulated by difficulties to exertion, and partial to exercise the power he was conscious of possessing over these difficulties, just as much in his recreation and in the ordinary affairs of life as in his scientific pursuits or in matters of the highest importance. The spring and elasticity of his mind were extraordinary. When he was in health, or, indeed, even when afflicted by disease, no misfortunes could long depress him. Yielding he looked upon as unmanly weakness, which he always resisted, either by mental effort or by change of pursuit and scene. This tenacity of purpose and heroic temper was very remarkably exhibited during his long illness. He strenuously attempted to make head against it, trying various remedies, successively consulting different physicians, using different kinds of diet, and changing his place of residence from north to south, and south to north, according to the seasons and his sensations.

In his friendships he was warm and disinterested, and he felt a genuine delight in cultivating them. Fashion did not attract him, nor rank ; and not even genius and knowledge had such strong charms for him as goodness of heart, simplicity of mind, and genuine but unobtrusive mirth. That there can be no true friendship except with the good, —*Nisi in bonis amicitiam esse non posse*,—was the rule he observed in his early youth, and the rule which guided him to the close of his useful life.

He was a man of true independence of character, and preferred conferring to receiving favours. His disposition inclined to generosity, and he was always prompt to relieve struggling and suffering merit. It is asserted by some of his critics that he showed too great a deference to rank, but we are unable to find any satisfactory grounds for the assertion, which seems to have originated in the pleasure he undoubtedly experienced in the graces and courtesies of life. He was well fitted, by his versatile acquirements and refinement of manners, to shine in the higher circles, and these were always open to a man of such brilliant reputation. It is certain that he never sacrificed his independence in order to gain admission to them.

In politics, as in science, he adopted the celebrated motto of the Royal Society, *Nullius in verba*, and followed no leader, adopted no party shibboleths. He held himself free to give his support to good measures, from whatever quarter they came; and to offer his honest admiration to a great statesman, to whatever political section he belonged. His principles were those of a sincere admirer of constitutional government, who believed that the prosperity of the country was bound up with its maintenance. In one of his works he very justly says: "Amongst the rival nations that may be considered as forming the republic of modern Europe, you will see one pre-eminent for her maritime strength and colonial and commercial enterprise, and you will find that *she* retains her superiority only because it is favourable to the liberty of mankind."

In disposition he was social, agreeable, cheerful; when in health delighting in society, and always cordially received, from the gift he possessed of blending amusement and information in his varied conversation.

As a man of science he was distinguished by the quickness of his intellectual perceptions, and by his remarkable power of analysis and compari-

son. He was, as we have seen, a passionate lover of Nature, and he had also a ready and accurate appreciation of what was good and beautiful in Art. On his poetical merits we have already offered an opinion. He had no pretensions to be considered one of the illustrious brotherhood of song, but he knew how to embody appropriate thoughts in elegant language, and his verse is certainly far superior to that of the "mob of gentlemen who write with ease."

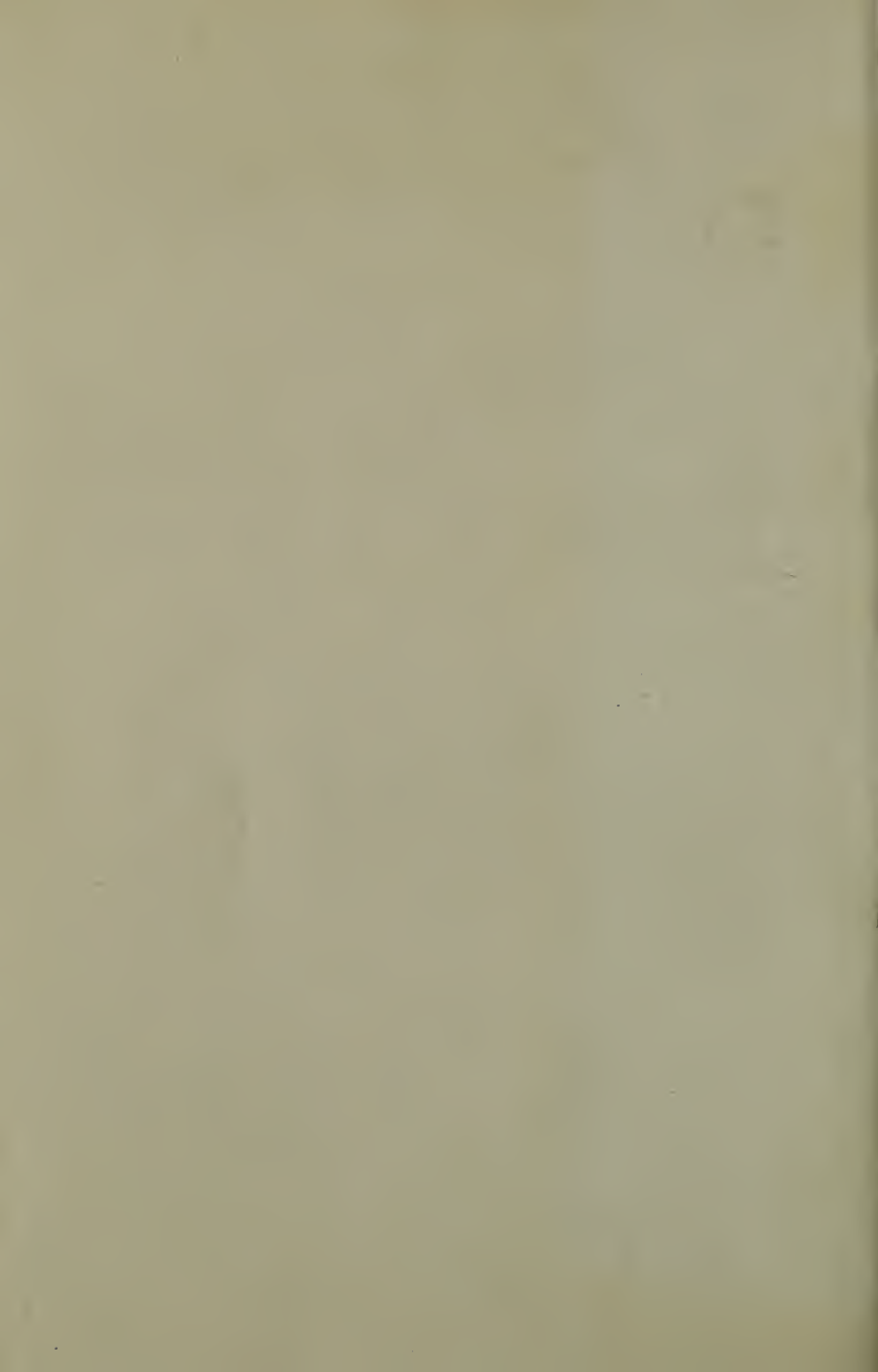
To conclude: we may say with an American writer, that we look upon Sir Humphrey Davy as having afforded a striking example of what the Romans called *a man of good fortune*; whose success, even in their view, was not, however, the result of accident, but of ingenuity and wisdom to devise plans, and of skill and industry to bring them to a successful issue. He was fortunate in his theories, fortunate in his discoveries, and fortunate in living in an age sufficiently enlightened to appreciate his merits.

It may not be for all of us to meet with his "good fortune;" but it is at least possible to *deserve* it. We can imitate his perseverance, his resolution, and his unceasing mental activity; his courtesy, his warmth of heart, his grace of manner,

his Christian confidence : and it is for this reason that we have told, thus simply and unpretendingly, the story of the life and work and character of

SIR HUMPHREY DAVY.





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